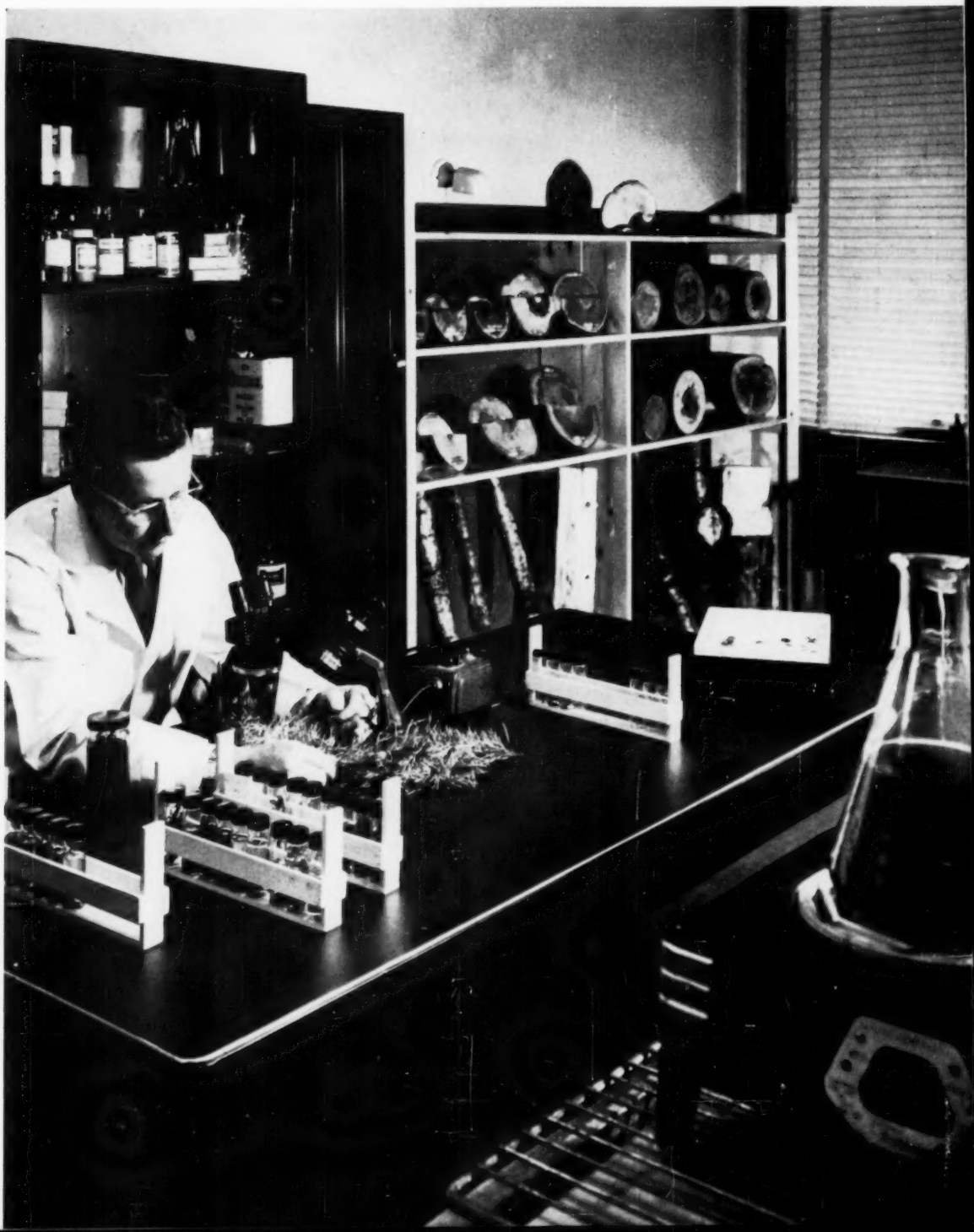
Journal of FORESTRY

NOVEMBER 1953



SOCIETY OF AMERICAN FORESTERS 1900

Volume 51
Number 11

Get Set to Spring Into Action with INDIAN FIRE PUMPS

SEND FOR NEW INDIAN FIRE PUMP CATALOG

D. B. SMITH & CO.

MAIN 2
UTICA 2, N.Y.

PACIFIC COAST BRANCHES:

Pacific Equipment & Engineering Company
444 Jessie Street
San Francisco 7, California

Fred S. Barnett Company
2002 S. E. 8th Ave.
Portland, Oregon

Hill & Muir Supply Co.
3700 Fourth Avenue South
Seattle, Washington

King C. Curtis Company
417 E. Third Street
Los Angeles, California

Fred S. Barnett Company
605 Spring Street
Klamath Falls, Oregon

L. M. Curtis & Sons
426 West Third South
Salt Lake City, Utah

CANADIAN AGENTS:

Hoch Pratt Limited
210 Alexander Street
Vancouver, B. C., Canada

D. A. Mackay & Sons, Ltd.
Hamilton, Canada

VOLUME 51 ● NUMBER 11 NOVEMBER 1953

Journal of Forestry

Editorial Staff

ARTHUR B. MEYER ..... *Editor*
HENRY CLEPPER ..... *Managing Editor*
L. AUDREY WARREN ..... *Business Manager*

Associate Editors

HAROLD H. BISWELL, *Range Management*, School of Forestry, University of California, Berkeley 4, Calif.

C. FRANK BROCKMAN, *Forest Recreation*, College of Forestry, University of Washington, Seattle 5, Wash.

CHARLES C. BUCK, *Forest Fire*, California Forest and Range Experiment Station, P.O. Box 245, Berkeley 1, Calif.

S. R. GEVORKIANTZ, *Mensuration*, Lake States Forest Experiment Station, University Farm, St. Paul 1, Minn.

HARVEY J. MACALONEY, *Forest Pathology and Entomology*, Forest Insect Laboratory, 628 E. Michigan Street, Milwaukee 2, Wis.

RALPH W. MARQUIS, *Forest Economics and Policy*, Northeastern Forest Experiment Station, 102 Motors Avenue, Upper Darby, Pa.

HERBERT B. MCKEAN, *Forest and Wood Utilization*, Timber Engineering Company, 1319 18th Street N. W., Washington 6, D. C.

CARL E. OSTROM, *Silviculture*, Southeastern Forest Experiment Station, 223 Federal Building, Asheville, N. C.

CLARENCE W. RICHEN, *Forest Management and Engineering*, Crown Zellerbach Corporation, Public Service Building, Portland 4, Ore.

H. G. WILM, *Forest Influence and Soils*, State University of New York College of Forestry, Syracuse 10, N. Y.

LEE E. YEAGER, *Forest-Wildlife Management*, Colorado Cooperative Wildlife Research Unit, 243 Forestry Building, Colorado A & M College, Fort Collins, Colo.

LLOYD THORPE, *Advertising Representative*, 604 Medical Arts Building, Seattle 1, Wash.

The JOURNAL OF FORESTRY, established in 1917, is the official organ of the Society of American Foresters, but the Society assumes no responsibility for the statements and opinions expressed by contributors.

Publication office, 825 Mills Building, 17th Street at Pennsylvania Avenue N. W., Washington 6, D. C. Address all correspondence concerning editorial or business matters to JOURNAL OF FORESTRY, 825 Mills Building, 17th Street at Pennsylvania Avenue N. W., Washington 6, D. C. Published monthly. Subscriptions $7.50 per year; single copies 75 cents. Missing numbers will be replaced without charge provided claim is made within thirty days after date of the following issue.

The editors are not responsible for loss or damage of manuscripts and photographs while in transit or in their possession. All material submitted for publication should be accompanied by return postage.

Copyright, 1953, by the Society of American Foresters.

Entered as second-class matter at the post office at Washington, D. C. Acceptance for mailing at the special rate of postage provided for in the Act of February 28, 1925, embodied in Paragraph 4, Section 412, P. L. and R., authorized November 10, 1927.

CONTENTS

COVER: Kimberly-Clark Corp. pest control research laboratory.

The 53rd Annual Meeting 791

Forestry and the Growth of Kimberly-Clark Corporation ..... *William J. Brown* 792

Simplifying the Determination of the Zero-Margin Diameter ..... *Allyn M. Herrick* 795

Effect of Cutting Methods on Logging Costs in Larch-Douglas-Fir 799
Arthur L. Roe and *A. E. Squillace*

Changing Economic Conditions and Forest Practices on Privately Owned Lands 803
David T. Mason

They Received Forestry Degrees 809
Joseph S. Illick

Seasonal Browsing of Woody Plants by White-Tailed Deer in the Ridge and Valley Section of Central Pennsylvania 815
W. C. Bramble and *M. K. Goddard*

Post-War Forestry in Western Europe—Part III.—Forestry Education and Research in Four European Countries *Stephen H. Spurr* 819

The Lateral-Terminal Elongation Growth Ratio of Red Pine as an Index of Saratoga Spittlebug Injury 822
Daniel M. Benjamin, Harold O. Batzer, and *Herbert G. Ewan*

Notes 824

Discussion of "Laminating and Steam Bending of Treated and Untreated Oak for Ship Timbers"; Estimating Girdling Time; Determining Burned Area by Aerial Mapping; Veneer Tables: Surface Feet Tabulations for Rotary Cut and Special Veneers; Release and Fertilization Stimulate Longleaf Pine Cone Crop.

Points of View 828

Comments on Growth Study Procedures in Small Woodlots.

Reviews 829

Soils and Land of Michigan; Freedom and Plenty: Ours to Save; A Standard Hardwood Quality Index: Proceedings of a Symposium; Fossil Plants of the Florissant Beds, Colorado.

Current Literature 833

Society Affairs 834

Forestry News 852

DOW

DOW BRUSH KILLERS IMPROVE VISIBILITY ON SWITCHBACKS

Chemical spraying is a positive, low-cost method of maintaining road width and minimizing danger spots on turns

Forcing roadside brush back—*and keeping it back*—is a major problem in forest maintenance. Esteron® Brush Killer and Esteron® 245, widely used to control brush and trees along logging roads, switchbacks, access roads and communication lines, greatly lessen the need for slashing and bulldozing. Where manual cutting is practical, spraying freshly cut stumps with either of these hard-hitting Dow brush killers prolongs its effectiveness by keeping stumps from resprouting.

Esteron Brush Killer is a mixture of powerful, low-volatility propylene glycol butyl ether esters of 2,4-D and 2,4,5-T. Esteron 245 is a straight 2,4,5-T ester formulation. Both have been proved in year-around basal bark spraying and frill application on weed trees.

Lumber company superintendents and foresters are invited to write for information on the use of Esteron Brush Killer and Esteron 245 for easier maintenance of forest roadways and also timber stand improvement. THE DOW CHEMICAL COMPANY, Agricultural Chemical Department, Midland, Michigan.

you can depend on DOW AGRICULTURAL CHEMICALS

DOW

Journal of Forestry

Official Organ of the Society of American Foresters

The 53rd Annual Meeting

At Colorado Springs, in the shadow of the majestic Rocky Mountains whose towering heights divide the waters of North America between the East and the West, the Society of American Foresters held its 53rd Annual Meeting September 14-17 with an attendance of nearly 750, including members, their ladies, and guests. Members were present from 41 states, District of Columbia, Alaska, British Columbia, and Ontario. Appropriately, the theme of the meeting was "Nature on Edge."

The four day conference included a general meeting, a Society business meeting, eleven technical sessions, two field trips, a banquet and chuck wagon dinner, and numerous related activities by groups within the Society. More than 100 foresters appeared on the program which was arranged by a committee under the chairmanship of J. V. K. Wagar of Colorado A&M College.

President George L. Drake opened the general meeting, held the morning of the 15th under the chairmanship of Harry R. Woodward, which was devoted to a discussion of problems facing forestry and land use in the Central Rocky Mountains. John W. Spencer, Jesse H. Buell, Harold G. Wilm, Noel D. Wygant, and J. V. K. Wagar discussed, respectively, public relations, forest management, watershed and range management, protection, and recreation and wildlife conditions as well as problems of import to the region. The vital contributions of the mountain area to the national welfare were made apparent in these papers and lent significance to the technical sessions at which the work of the profession in this and other regions was discussed in its many aspects.

Technical Sessions

Eleven technical sessions were held by the following Society divisions: education; silviculture; private forestry; forest products; public relations; forest economics and policy; forest management; watershed management; range management; forest recreation; and forest-wildlife management. At these sessions 57 papers were presented, one panel discussion was held, and comments from the floor were numerous.

Business Session

A business meeting dealing with affairs of the Society was held on the afternoon of September 15. At this time reports were made to the membership by the President, the executive secretary, the editor, and by the Society committees on accrediting, membership, international relations, safety, civil service, forest types, and "The Foresters Manual." (The Society Affairs department of this issue carries a full report of the session.)

President Drake's report stressed hoped-for future development in which the Society might strengthen its activities and broaden its fields of endeavor to the benefit of the Society, its membership, and the progress of American forestry.

Social Activities

On the evening of the 15th, following the afternoon business session, busses transported members, ladies, and guests—a total of some 675 persons—to the Garden of the Gods, well known scenic attraction of the Colorado Springs area. In this impressive setting, the city's Junior Chamber of Commerce produced a "Chuck Wagon Dinner" for the nourishment and entertainment of their guests. The surroundings, food eaten under the stars, and lively western style program all contributed to a well remembered social event.

The next evening, the 16th, at the close of the formal sessions of the meeting, the annual Society dinner was held in the municipal auditorium. Five hundred seventy five persons were in attendance. They were entertained with an exhibition western-style square dance, and by the Pejn Indian dance group. Following this, the diners were addressed by J. D. Pender, attorney and conservationist of Denver.

Two field trips were held on the last day of the scheduled program: one a tour of scenic and historic interest to Cripple Creek; the other a trip to and over the Manitou Experimental Forest and Range, a unit of the Rocky Mountain Forest and Range Experiment station where many problems vital to range and water management are under study.

An unusually large number of ladies, close to 200, were in attendance at this annual meeting. Their presence did much to add to the social events on the program and it is to be hoped that future meetings will be marked by a further increase in the number of foresters who bring their womenfolks.

Related Meetings

Preceding the opening of the meeting a one day executive session of the Council of Forestry School Executives was held, as well as an evening biennial convention of the honorary fraternity, Xi Sigma Pi.

The Association of Consulting Foresters and the National Council of Extension Foresters held evening meetings, and numerous alumni reunions took place at breakfasts

and luncheons.

Thanks

As is the tradition of the S.A.F. in its activities, arrangements for the annual meeting were made by volunteer workers from the membership. To those men in the land where nature stands most precipitously and majestically on edge, those in attendance and the Society at large extend thanks for the generous effort which helped make the 53rd Annual Meeting of the S.A.F. a success.

❦❦❦

Forestry and the Growth of Kimberly-Clark Corporation

William J. Brown
Kimberly-Clark Corp., Neenah, Wis.

Probably history will say that the period following and immediately preceding World War II was of greatest significance to the forestry profession because of the phenomenal increase of industrial effort in the growth of wood crops and the management of forest lands. If so, history will perhaps also observe that the period was one of the most poorly chronicled of all significant periods in forest history, not as to results, but as to the details of how the job was accomplished and how technical forestry work came to be integrated into the activity of industry. As a small step in rectifying such a possibility the JOURNAL *asked the author of this article to tell the profession how forestry played a part in the history of his corporation and what place he thinks it will assume in the future.*

WHEN SHAKESPEARE wrote "These trees shall be my books" he did not anticipate the time when the conversion of trees to books would actually take place. He was, of course, referring to the inspiration that trees gave him as he walked through the forests. Since his time, books made from trees have become commonplace. All people have received tremendous stimulation because of this conversion. The increase in the use of wood for pulp and papermaking has profoundly altered our standard of living and we witness each year the development of new uses for pulp products made from wood.

Forestry, too, has been markedly stimulated by the science of converting wood into pulp products. This is illustrated by telling about the forestry program of one company that is converting trees to books—at least to book paper. Its program may, or may not be typical but it, like the stories that could be told by other concerns, is part of an epochal movement in forestry on the North American continent that is still going on at a fast clip.

This company, one of the largest pulp and paper firms in North America, has a diversified list of products to manufacture. Interior packaging material, industrial wadding, and insulation are part. Newsprint, lithographing, book, magazine, and business papers are some more. Wallpapers, household papers, napkins eye glass wipers are still more. Then, in addition, there are the sanitary products like Kleenex, Kotex, and Sanek, manufactured for its biggest customer. All of these products have two things in common; all of them are derived from wood and they are all manufactured in the mills or subsidiaries and affiliates of the Kimberly-Clark Corporation of Neenah, Wisconsin.

From Rags to Wood

When this corporation started to make paper 81 years ago, its daily output was two tons of newsprint made from rags. This material was sufficient to start with but, within five years, it was evident that rags could not furnish the supply needed for continued expansion. Fortunately, Gottleib Keller had demonstrated in 1840, that it was commercially practical to make pulp by grinding wood. The improvements made in groundwood from then on encouraged the company to establish, in 1878, a mill to make manila wrapping paper from jute butts and groundwood pulp. According to Mr. J. A. Kimberly, one of the company founders, this was the first attempt to convince the consumer that wood manila could take the place of jute papers. Two years later, a sulphite mill was built which also used wood for its raw material.

From then on, the company relied on wood as its principal raw material for pulp making. Most of it was purchased locally around each mill. In 1903, fifty years ago, it bought 17,000 acres of timberlands of which 11,550 acres are still owned. It is estimated that wood consumption in this period was over 100,000 cords a year.

Expansion

The continued expansion of plant capacity created a greater demand for wood all the time. Purchasing and scheduling its delivery required experienced guidance. This led the company to organize with William Bonifas, in 1909, the William Bonifas Lumber Company. Three years later, Mr. Bonifas sold his interest in this company to Kimberly-Clark. He was still retained as woodlands manager and vice president of the lumber company. This venture put Kimberly-Clark into the forest products business, such as sawmilling, both wholesaling and retailing, where it has remained ever since. Bonifas started to buy timberland

in northern Michigan, and later in northern Wisconsin. In 1916, Kimberly-Clark bought a controlling interest in North Star Timber Company which began to purchase timberlands in Minnesota.

In 1920, Kimberly-Clark made its first move into northern Ontario at the Village of Kapuskasing, a prisoner of war camp during World War I. This operation was expanded in 1926 when Kimberly-Clark and the New York Times joined forces to organize the Spruce Falls Power and Paper Company, Limited. This company rebuilt the mill to a capacity of over 300,000 cords of wood a year. By 1928, the first year of operation, this mill more than doubled the consumption of wood in all of Kimberly-Clark's related activities.

The Start of Technical Forestry

This same year, the Spruce Falls Company hired Robert W. Lyons as woodlands manager. He was the first forester in the general Kimberly-Clark organization. He came to work with over ten years of experience in silviculture, nursery operation and production, road building and logging. He had acquired this while working with Mr. Ellwood Wilson of the Laurentide Company in Quebec. (Mr. Wilson was a member of the Society of American Foresters for years, and was a Fellow of the Society at the time of his death in 1952).

Mr. Lyons' arrival at Kapuskasing to work for Spruce Falls was immediately noticeable. He undertook to gradually eliminate the system of contract logging and started producing pulpwood with company operated camps. He insisted that foresters be put in charge of these operations and be held responsible for their quota of production. He started the woodlands organization on its own accounting system to insure adequate cost control of those operations.

As soon as pulpwood production was reorganized and operating, a forest management program was started. It did not take very long before this ran into difficulties. A review of the then current literature disclosed that very little was known about the silvicultural requirements for management of black spruce in the Clay Belt of northern Ontario. This was understandable. There had been very little call for any forest management in this type before then. This led to an enlargement of the forestry program to get some research started. Field observations were made and recorded on thousands of acres of all age classes. Permanent sample plots were established to furnish a record of tree growth. Controlled cutting experiments were laid out to find out how reproduction of black spruce could be improved. Here was started an action program in forest research that has been a constant part of this company's woodlands development.

It sounds easy when told about now, but the work of forestry wasn't always so in the beginning. First of all, it had to be proven to the management of Spruce Falls and Kimberly-Clark that foresters could produce wood cheaper than the regular producers. The foresters proved themselves to be better operators, by far, than the old timers. Wood costs to the mill came down immediately during the first year. From then on, forestry and foresters became a part of company operations. By 1936, eight years later, they were responsible for all of the wood procurement for Spruce Falls. In addition, foresters were making progress in research on the silviculture of black spruce. By this time, too, Kimberly-Clark's total consumption of wood was close to 375,000 cords a year.

The Advance of Technical Forestry

The management of the company was convinced of the soundness of the forestry program. They wanted to adopt a similar program in the Lake States and asked Mr. Lyons to start it. So, in 1936, he became vice president and general manager of the William Bonifas Lumber Company with headquarters in northern Michigan. He became general manager of the North Star Timber Company in Minnesota at the same time. This was in addition to general supervision of the woodlands organization that had been developed at Spruce Falls in Canada. One of the first jobs he had to handle was inventory of the plant and equipment as well as the timberlands of these two companies. Foresters were employed to do these important jobs. Plans were made and started for building up the complete forestry program. Negotiations were concluded for the purchase of thousands of acres of additional forest land. Experimental cuttings were made. Sample plots were laid out for permanent records. Growth studies were initiated and management plans developed.

Then came the disruption of World War II. For its duration, the department was geared to all-out production of timber to keep the mills running. Foresters, like others, were busy on this job. They were still planning for a better program of forestry, however. Meanwhile, in 1940, Mr. Lyons had moved his headquarters from northern Michigan to Neenah, Wisconsin, to become, in 1942, general manager of the Woodlands Department. This was recognition of the importance of this department's activities to Kimberly-Clark. Foresters began to be a part of the staff at headquarters. They were no longer just a strange curiosity to be found only in the woods and in the field offices. Foresters were taking their place in the organization alongside the engineers, the chemists, and the other technicians. Foresters became important people, for the mills of Kimberly-Clark and Spruce Falls were consuming over a half million cords of pulpwood a year.

Postwar development brought additional expansion. Another new mill was built in Canada. Woodlands limits for this mill were an enlargement on a previous limit used for exporting pulpwood from Canada to the United States. Foresters were already in charge here. They were ready to expand their operations for the new mill capacity. Then came additional expansion to Alabama by means of

an affiliated company which Kimberly-Clark was to manage. The Coosa River Newsprint Company was organized to make newsprint from southern pine trees. Foresters were called upon to report if there was enough timber to supply the mill. They were put in charge of buying forest land long before the mill started its first run. They were responsible for getting wood to the mill and for keeping it going since then.

In 1945, Mr. Lyons was appointed assistant vice president of the Kimberly-Clark Corporation to be followed in 1947 by his election as a company director. Since then he was appointed vice president in 1951. Here is a forester in the very top level of management helping to establish the policies of the corporation.

Nursery Activities

The older established parts of the Woodlands Department have been busy with their postwar development also. Spruce Falls' management plan called for a company operated nursery to help reforest the upland types with adequate spruce trees. This was started in 1947 and is now turning out 2-2 spruce for both of the Canadian companies. North Star Timber Company leased the Knife River Nursery in Minnesota from the U. S. Forest Service. It is producing 2-2 spruce for the use of North Star and Bonifas in the Lake States. The first pine seedlings were to be lifted in the fall of 1953 from a nursery that the Coosa River Newsprint Company, which is under Kimberly-Clark management, is establishing in Alabama.

Management Plans

Management plans are completed for Bonifas forest lands in Michigan and Wisconsin. They are completed also for LongLac Pulp and Paper Company, the second of the two Canadian companies. They are being developed for the rest of the organization as rapidly as possible. Research in forestry is an important element of these plans. Studies of the silvicultural requirements of all the tree species the company uses are going on continuously. But that isn't all. How can the damage to forests caused by insects and diseases be reduced? How can the damage to wood in storage be controlled? These questions called for technical answers so the department established a pest control laboratory in 1952 with an entomologist and a pathologist to run it. The studies of forest insects and diseases that these men carry out will benefit all timber crops. The results will be available to all landowners and should help them produce a higher quaity of forest products.

Administration of Technical Work

At present, there are 120 foresters in the organization. One hundred of them are in administrative work and are responsible for delivering to the mills over one million cords of wood a year. The other 20 are in the forestry division under the general direction of the chief forester. The organization of the department is simple and direct. The vice president has delegated the supervision of the work to Mr. Gordon G. Cosens the general manager. He, in turn, has Mr. G. W. Phipps as assistant general manager in Canada and Mr. T. R. Powell as local manager in the Lake States. These men are responsible for logging operations and wood procurement. The chief forester, Mr. J. B. Millar who is responsible for the development of the forestry program, reports directly to the general manager. also. Each of the subsidiary and affiliated companies has its own woodlands organization with a forester as manager. This man is responsible for producing the quota of wood assigned to his unit. In the Canadian operations this wood will be produced mostly from leased Crown lands by company operations. In the States this production will be arranged for by purchase on the open market, by producers on leased lands, and by producers on company lands. Each of these woodland organizations has its own forestry staff. In addition to working on forest managemen problems on company owned or leased land, these men give management help and advice to other landowners. This method of organizing, places most of the men in the field, where they have direct supervision of their work.

The Future?

There is certainly no thought that Kimberly-Clark will turn back from the forestry program now under development. The company foresters must continue to be men of integrity. They must have the imagination to think ahead on their jobs, the determination to get their jobs done at reasonable cost, and the ability to sell themselves and their ideas to the top management of the corporation. Does this sound like a tall order? It is, but an exciting one, too.

The future of forestry in this corporation promises to be just as interesting in the future as past activities have been. There will be no standing still. As opportunity comes along there will continue to be additions made to the acreage of forest land now owned. There will be more intensive application of the silvicultural requirements for management of these forests. There will be a balance arrived at between the harvest of tree crops and the productive capacity of company owned forest land. This capacity will be built up, too, by "sweetening up" with planting, the areas that are partially stocked. There will be thinnings and stand conversion to supervise. There will be plenty of work for foresters to do for a long time to come—so that Shakespeare's quotation will continue to have application in our profession.

Simplifying the Determination of the Zero-Margin Diameter[1]

Allyn M. Herrick
Agricultural Experiment Station, Purdue University, Lafayette, Ind.

DURING THE PAST quarter-century many so-called "selective logging studies" were conducted in various parts of the United States to show the economic efficacy of partial cutting. These studies were usually carried to the end of determining conversion returns or stumpage values according to tree size classes. And they showed that the maximum profit per unit of volume was to be realized when a stand was cut to a high diameter limit.

Lumber grade yields—and therefore lumber values—generally improve as tree size increases; at the same time efficiency in conversion improves, so direct costs go down per unit volume. This combination encourages the forest manager to refrain from cutting all but the larger trees. Though it may be sound from the financial point of view, this practice may be horrid silviculture if it prohibits regeneration of desirable species. Yet the interaction of trends of direct cost and product value cannot be ignored in the application of forest management.

Problem

This study has been concerned with the simplification of the problem of estimating the economic diameter limit.[2] The curve of direct production cost per thousand board feet (M. bd. ft.) is a complex, reciprocal function of tree or log diameter; value per M. bd. ft. according to log or tree size is likewise a difficult trend to describe mathematically. Should it be possible to correlate both direct cost and product value with the same independent variable, and to write an empirical formula for each, a purely mathematical estimate of the zero-margin tree or log becomes feasible.

Although they are here illustrated by the sawmilling operation only, and represent but one species and milling environment, the techniques involved are expected to be generally applicable. They have been applied successfully with a different species sawed at a different mill. Cursory examination of various trends of logging cost suggests that the techniques may be used for any or all phases of the logging-milling cost complex that are truly variable (with time).

Procedure

During the course of an earlier study of Indiana hardwood sawlogs *(2)*, data were recorded that showed the direct headsaw time per log (including the loading of the carriage) for more than 400 logs of many different species, of a wide assortment of sizes, and in several sawmills. A record also was kept of the time consumed by delays of one sort or another. This study is based upon the sawing of 72 red oak logs in a band mill in northern Indiana. Delay time for this mill amounted to 57¼ minutes out of 13½ hours elapsed time, or seven percent.

Logs ranged from 8 inches to 27 inches in scaling diameter and from 8 feet to 20 feet in length. Headsaw times[3] ranged from 1¼ minutes to 9¾ minutes per log, or from about 13 minutes to about 46 minutes per M. bd. ft., mill tally. The mean log diameter was 14.9 inches, the length 12.7 feet, the time 3.1 minutes per log or 27.4 minutes per M. bd. ft.

Of the 72 logs observed, 12 were Prime, 16 were No. 1, 30 were No. 2, and 14 were No. 3 Grade.[4] The volumes of the various lumber grades recovered gave quality indexes[5] from 35.2 to 96.6 percent, averaging 62.8 percent.

Basic data were available on individual log record cards. These were assembled for all 72 logs and the mill tally volume per log was converted to "number of logs per M. bd. ft.", or log run. Milling time per M. bd. ft. was found for each log by multiplying the headsaw time in minutes per log by log run. Computation of the quality index for each log completed the preliminary tabulation.

A straight line was fitted to the saw times per M. bd. ft. and the corresponding log run figures by the method of least squares. The "F test," described by Kenney *(4)*, was applied to investigate the hypothesis that saw time and log run were linearly related.

Since saw time was found to be determined[6] to the extent of 53 percent by log run, it was decided to consider log quality and to study the multiple correlation of headsaw time with log run and log grade. Prime logs were numerically designated as "zero," other grades as numbered. The procedure was that of a typical, three-variable multiple regression analysis such as given by Guilford *(1)* and many others.

Quality indexes for the 72 logs were handled in the same manner as the headsaw times per M. bd. ft. The simple intercorrelation of quality index with log run was found using least squares and the regression was tested for linearity by determining "F." Next, log grade was introduced into the relationship as an independent variable and the combined effect of log grade and log run on quality index was investigated.

The equation for the regression

---

[1]Journal Paper No. 572 of the Purdue Agricultural Experiment Station, submitted for publication November 2, 1951.

[2]The diameter cutting limit yielding the maximum stumpage revenue per acre, i.e, the diameter at the intersection of the trends of direct (variable) production cost and product value.

[3]Headsaw times quoted are "working" times. To convert working time to "total time" multiply by 1.076.

[4]Purdue hardwood log grades *(3)*.

[5]A "mill run" value expressed as a percentage of the FAS price *(2)*.

[6]The coefficient of determination is the square of the correlation coefficient.

of saw time on log run was converted into one showing the cost of sawmilling per M. bd. ft. First, "working time" was converted into "total time" by multiplying by 1,076,[3] and then a "machine rate" for the mill was applied. Likewise, the expression for quality index was converted to dollar value. An estimated rough, green, FAS price of $120 per M, when multiplied by the regression equivalent of quality index gave a statement of lumber value corresponding to given log run figures.

The separate expressions for lumber value and production cost were equated and solved for the critical value of log run. So as to enable the identification of the economic log diameter from the log run figure just determined, it was necessary to find the relationship between log volume (one thousand divided by log run) and log diameter. Hence the mill tally volume per foot of log length was found for each of the 72 logs included in the study and the regression of this volume on log diameter was calculated by the method of least squares. Fitted was an equation of the form:

$$V/L = a + b\,(D) + c\,(D^2),$$

in which V = mill tally volume in board feet, L = scaling length of log in feet, D = scaling diameter in inches, and a, b, and c are the regression constant and coefficients. Volumes estimated by this equation were converted to log run equivalents and the latter were correlated with log diameter and length. This chart (Fig. 3) allows the determination of diameters corresponding to any log length-log run combination.

TABLE 1.—STATISTICS PERTAINING TO THE CORRELATION ANALYSIS

Statistic	Dependent variable: Saw time, T	Quality index, Q	Log run, R	Log grade, G
Simple correlation coefficient				
One variable:				
Log run, R	+0.729	−0.609	.....	+0.570
Log grade, G	+ .379	− .728	+0.570	.....
Multiple correlation coefficient				
Independent variables:				
Log run, R, and log grade, G	.730	.765	.....	.....
Simple linear regression coefficient				
Independent variables:				
Log run, R	+1.19	−2.07	.....	.....
Partial linear regression coefficients				
Independent variables:				
Log run, R	+1.24	− .97	.....	.....
Log grade, G	− .41	−8.93	.....	.....
Mean	27.34	62.84	8.87	1.64
Standard deviation	7.45	15.51	4.57	.98

Results and Discussion

The preliminary analysis provided simple correlation coefficients as shown in Table 1. Saw time is seen to be more strongly correlated with log run than with log grade, both coefficients being positive. Quality index, on the other hand, is more strongly correlated with log grade than with log run, and both of these simple correlations are negative. Between the two independent variables a positive, moderately strong correlation exists.

The regression of headsaw time (T) on log run (R) computed to be:

$$T = 16.80 + 1.19\,(R)$$

(Fig. 1). Addition of log grade (G) as a second independent variable did not improve the prediction of saw time appreciably. Judging by the relative magnitudes of the standard partial regression coefficients, log run was about 14 times as strong as log grade in affecting saw time. The multiple relationship developed into:

$$T = 17.02 + 1.24\,(R) - 0.41\,(G);$$

the coefficient of multiple correlation was 0.730 as compared with the simple correlation of 0.729 between time and log run. Strong correlation between log run and log grade is responsible for the failure of the added variable to improve the estimate. The standard error of estimating saw time from log run alone was 5.10 minutes per M. bd. ft.

Quality index (Q), when correlated with log run (R), produced a regression line defined by the equation:

$$Q = 81.17 - 2.07\,(R).$$

Here the standard error of estimating quality index was 12.3 percent. When log grade (G) was introduced as a third variable, however, the error of estimating quality index dropped to 10.0 percent.

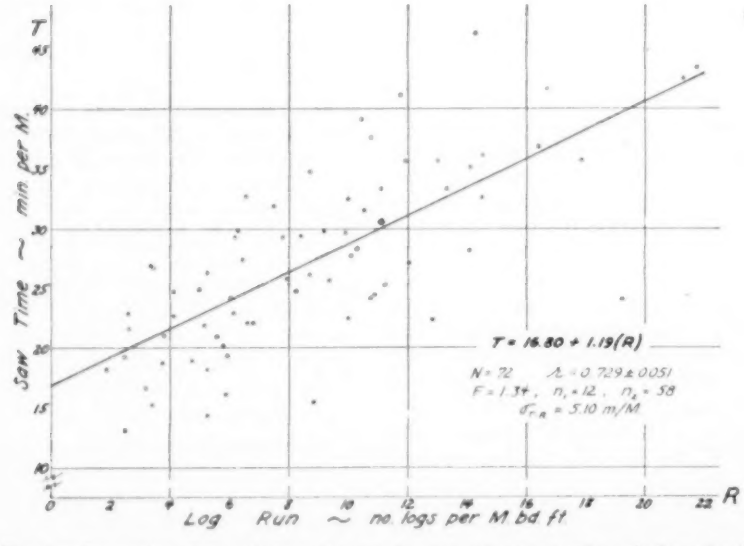


FIG. 1.—Regression of saw time on log run for red oak at a northern Indiana band mill.

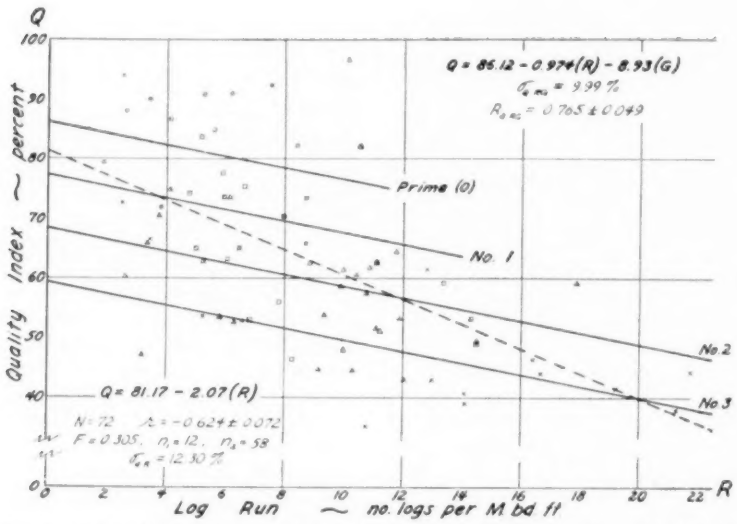


FIG. 2.—Regression of quality index on log run both ignoring and considering log grade. Red oak in northern Indiana.

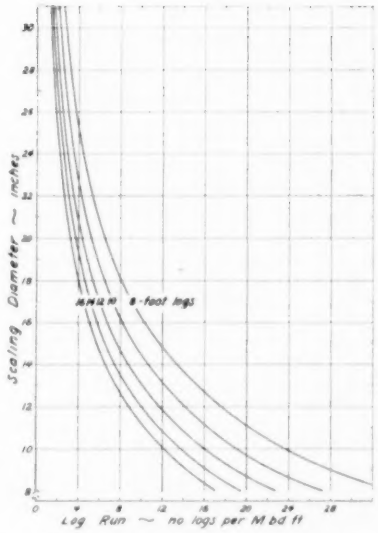


FIG. 3.—Chart for finding the diameter of a log of a certain length and log run. Red oak in northern Indiana.

The multiple relationship, $Q = 86.12 - 0.97\,(R) - 8.93\,(G)$ showed a correlation between quality index and the two independent variables of 0.765. Thus the use of both log run and log grade in predicting quality index is justifiable. Figure 2 shows the regressions of quality index on log run, for all grades combined as well as for the separate log grades.

The "F tests" failed to refute the hypotheses that the regression of saw time on log run and the regression of quality index on log run were linear.

Headsaw time in minutes per M. bd. ft. as estimated from log run represents the net working time, but for the study mill, total (elapsed) time was 7.6 percent greater than working time. Applying this percentage and an assumed hourly cost of mill operation of $40 to the regression of saw time on log run, we have:

Working time per M equals ——— $T = 16.80 + 1.19\,(R)$

Total time per M equals ——— $1.076\,(T) = 1.076\,[16.80 + 1.19\,(R)]$

Milling cost per M equals ——— $MC = \$40/60\text{min.}\,(1.076\,[16.80 + 1.19\,(R)])$

$MC = 12.05 + .853\,(R)$

Now, assuming that logs deliver at the mill yard for $50 per M., log scale, and yield a 25 percent overrun, the cost of logs, mill tally, ($40 per M) when added to the cost of milling equals the total cost of the rough, green lumber produced. As stated:

Total cost of lumber equals ———

$TC = 40.00 + 12.05 + .853\,(R)$

$= 52.05 + .853\,(R)$

Under these assumptions the total cost of producing rough, green, red oak lumber at this mill from logs running 10 to the M. bd. ft. would be:

$TC = \$52.05 + .853\,(10)$

$= \$60.58$ per M.

One advantage attending the use of the quality index in describing lumber grade yields is that the index may be converted readily into an estimate of the dollar value of the lumber. Assuming a rough, green selling price of $120 per M. bd. ft. for FAS grade red oak at this mill, the average (mill run) price of the lumber sawed from all grades of log may be found from the formula derived as follows:

Quality index equals ——— $Q = 81.17 - 2.07\,(R)$

Price per M equals ——— $1.2\,(Q) = 1.2\,[81.17 - 2.07\,(R)]$[1]

Selling price equals ——— $SP = 97.40 - 2.484\,(R)$

For a log yielding a mill tally volume of 100 board feet, $(R = 10)$, the selling price of the lumber it contains would be estimated as:

$SP = 97.40 - 2.484\,(10)$

$= \$72.56$ per M.

If log grade is ignored, red oak logs running 10 to the M. bd. ft. would provide a margin of:

$SP - TC = \$72.56 - 60.58$

$= \$11.98$ per M.

under the assumptions made as to cost and price.

Equating the formulas for selling price and total cost allows the solution of a "break-even" log run, the size of log that just pays its way, nothing more. For the illustrations used heretofore:

$SP = 97.40 - 2.484\,(R)$

$TC = 52.05 + 0.853\,(R)$

$97.40 - 2.484\,(R) = 52.05 + 0.853\,(R)$

$3.337\,(R) = 45.35$

$R = 13.6$ logs per M. bd. ft.

Log dimensions corresponding to log run may be found in Figure 3. The following least squares regression was applied to obtain volume (V) per log:

$V/L = 2.089 - 0.237\,(D) + 0.0542\,(D^2)$,

[1] Due to the fact that quality index is here calculated in percentage and not the decimal equivalent thereof, it is necessary to multiply by the FAS price in hundreds of dollars, i.e., 1.2 rather than 120.

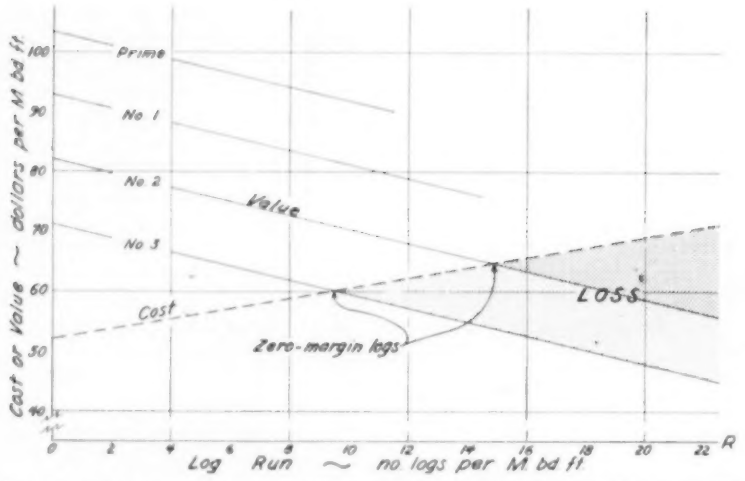


FIG. 4.—Graph showing the identification of the zero-margin log at the intersection of trends of production cost and lumber value. (See text for derivation of cost and value.)

for various values of diameter (D) and length (L). These volumes, then, were converted to the equivalent log run values and plotted with the corresponding diameters and lengths to form Figure 3. The estimated break-even log run, 13.6, is seen to represent an 11-inch log, if the length were 12 feet.

Log grade was noted as being an important determinant of quality index. For this reason, break-even calculations such as the one just concluded ought to be tempered by considering log grade as a variable. As before, converting quality index to dollars involves merely multiplying by 1.2, in this case.

Quality index equals	$Q = 86.12 - 0.97(R) - 8.93(G)$
Price per M equals	$1.2(Q) = 1.2[86.12 - 0.97(R) - 8.93(G)]$
Selling price equals	$SP = 103.34 - 1.164(R) - 10.72(G)$

Since there are size restrictions on the three better log grades — a No. 2 log must be at least 10 inches in scaling diameter, a No. 1 log at least 14 inches, and a Prime log at least 16 inches — it is not possible to have all combinations of log run and log grade in this formula. Large values of log run (small logs) necessarily restrict the log quality to the lower grades.

Although a log that yields 100 board feet (log run = 10) could scarcely be a Prime log,[8] any of the other three grades is possible. If the log were a No. 1 grade, the selling price would figure: $SP = \$103.34 - 1.164\,(10) - 10.72\,(1) = \$80.98$ per M. bd. ft., using the same assumptions as before. Clearly, the average price would drop $10.72 with each drop in log grade; lumber from a No. 2 log that would yield the same volume would be worth $70.26 per M., and that from a No. 3 log, only $59.54 per M. Values per M. bd. ft. for the various grades of logs are illustrated in Figure 4, if FAS lumber is worth $120 per M.

Solution of the equations for selling price according to log grade and for total cost permits the estimation of the break-even log run values:

$$SP = 103.34 - 1.164\,(R) - 10.72\,(G)$$
$$TC = 52.05 + 0.853(R)$$

Subtracting,

$$O = 51.29 - 2.017\,(R) - 10.72\,(G)$$
$$R = 25.43 - 5.31\,(G)$$

The cost trend in Figure 4 provides a graphic solution of this equation. Thus, if the log is grade No. 2, the zero-margin log run is 14.8. Figure 3 shows that this log run equals a diameter of about 10.5 inches for a log 12 feet long. If it is a No. 3 log, the break-even log run is 9.5, or about a 13.5-inch diameter for a 12-foot log. Since logs smaller than 10 inches in diameter cannot be Grade 2, the break-even calculation shows that practically any 12-foot No. 2 log will yield a positive margin under the assumed conditions of lumber selling price, cost of logs and cost of mill operation.

[8] Even if it were as short as 8 feet it would not be apt to exceed 15 inches in diameter.

Summary

This study of some of the economic aspects of sawmilling has suggested that:

1. The use of log run in place of log or tree diameter simplifies the prediction of both sawmilling costs and lumber value yields. Straight-line relationships are substituted for complex functions of log or tree diameter.

2. Log grade is important in estimating the log quality index, but is relatively unimportant in controlling saw-time, except as grade is reflected by log diameter.

3. Sawing time is readily convertible to sawing cost; quality index is simply changed to lumber value. Regressions of sawing cost on log run and lumber value on log run may be graphically or algebraically solved to determine the zero-margin log.

Literature Cited

1. GUILFORD, J. P. 1936. Psychometric methods. McGraw Hill, New York.
2. HERRICK, A. M. 1946. Grade yields and overrun from Indiana hardwood sawlogs. Bull. 516, Purdue Agric. Exp. Sta., Lafayette, Indiana. 59 pp., illus.
3. ———. 1949. How to grade hardwood sawlogs. Bull. 346, Purdue Agric. Extension Service, Lafayette, Indiana. 7 pp., illus.
4. KENNEY, J. F. 1941. Mathematics of statistics. D. Van Nostrand, New York.

Effect of Cutting Methods on Logging Costs in Larch—Douglas-Fir[1]

Arthur L. Roe and A. E. Squillace

Northern Rocky Mountain Forest and Range Experiment Station.[2]

Silviculturists tend to overlook financial aspects of cutting methods in their desire for greater understanding of purely biological factors. Reporting in a study made in the larch—Douglas-fir type in the northern Rocky Mountains, the authors discuss some effects of cutting method upon logging costs.

FINANCIAL aspects frequently cause modification of cutting practices. Often the best cutting methods, from an ecological standpoint, are restricted by high cost of application. In such instances a compromise is necessary—the biological advantages must be weighed against the business advantages. Silviculturists have in many instances failed to give adequate consideration to the financial factors. Studies of cutting methods to fully answer the question, "What is the best cutting practice?", must recognize the financial as well as the biological feasibility of the methods.

A study of cutting methods was initiated in the western larch—Douglas-fir timber type on the Coram Experimental Forest in Montana in 1950. In order to provide a complete appraisal of the several methods being tested, the study was designed to encompass financial aspects of timber management in addition to the purely biological factors. This report features one phase of the financial aspects—the effect of different cutting systems upon the cost of logging.

Three plots on a 137-acre tract of mature and overmature western larch—Douglas-fir timber were cut under different marking rules. Cutting under these rules resulted in differences in the quality, size, and amount of timber removed. Logging costs were recorded in detail. Summary and analysis of these costs showed how, in this instance, logging costs were affected differently by (1) a seed-tree cutting, (2) an economic selective cutting, and (3) a two-cut shelterwood system.

Description of Area and Timber Stand

The study was conducted in an overmature larch-Douglas-fir stand on a northwest facing slope where larch made up about 73 percent of the volume and Douglas-fir most of the remainder. Engelmann spruce, white pine, and lodgepole pine occurred in minor numbers. Stand density averaged 20 400 board feet (net volume) per acre in trees 12 inches d.b.h. and larger.

The stand composed of two age classes: 500-year-old veterans scattered throughout the stand and 300-year-old trees which made up the major part of the stand in number of stems per acre. The stand was reasonably uniform except that the trees were somewhat smaller than average in the shelterwood cutting and larger than average in the economic selective cutting. These differences were caused chiefly by uneven distribution of the old trees in the 500-year age class. The stocking of trees by average diameter and number of stems larger than 11.5 inches d.b.h. is shown:

	Av. d.b.h. (inches)	Trees per acre (number)
Economic selective logging	19.3	58
Seed tree cutting	17.2	70
Shelterwood cutting	17.0	84

The topography was reasonably favorable for logging. Slopes averaged about 20 to 25 percent and reached a maximum of about 35 to 45 percent in a limited portion of each of the plots. Occurrence of windfalls and shrub cover was moderately light for the larch—Douglas-fir type.

Marking Rules

Marking rules employed in each of the cutting plots were:

Seed-tree method (10.8 acres).

a. Reserve as seed trees four to five dominant, vigorous well-distributed larch trees per acre.

b. Cut the balance of the stand to the minimum commercial limit of 1½-log height to a 9-inch top diameter.

Economic selective cutting method (10.3 acres).

a. Cut 75 percent of the larch trees 18 inches d.b.h. and larger, and 25 percent of the larch trees under 18 inches d.b.h.

b. Cut all Douglas-fir, spruce, lodgepole pine, and white pine 18 inches d.b.h. and over, and 50 percent of those under 18 inches d.b.h.

Shelterwood method (55.6 acres).

a. Cut all merchantable larch trees of poor vigor and those of undesirable form in the better vigor groups.

b. Cut all merchantable Douglas-fir, lodgepole pine, white pine, and alpine fir.

c. Thin crowded groups by removing merchantable trees to provide free growing space around the crown of each reserve tree favoring moderate to good vigor larch trees.

d. Cut all merchantable trees that are visibly infected with dwarf mistletoe.

e. Reserve, in general, about 50 percent of the volume in an open residual stand composed of well-spaced, thrifty trees that appear capable of producing abundant seed, growing well, and withstanding uprooting or breakage by wind.

[1]The authors wish to acknowledge the assistance received from cooperating individuals and organizations. The F. K. and L. Lumber Company of Martin City, Montana, maintained daily logging cost records and manifested an active, helpful interest in the progress of the job. Assistant Forest Supervisor John R. Castles and Ranger Bert A. Bealey of the Flathead National Forest administered the sale and cooperated in many other ways.

[2]Forest Service, U. S. Dept. Agric., Missoula, Mont.

Silvicultural Objectives

The three harvest cutting methods being tested possess certain silvicultural objectives.

Seed-tree method.—The seed-tree cutting method has long been recognized as a sound silvicultural system to apply to relatively intolerant species such as larch and Douglas-fir. It provides conditions favoring immediate even-aged natural regeneration, and good conditions for juvenile development of the new stand. However, seed trees may be lost if they do not survive until the next cut and if relogging the area for such small volumes is not feasible. Changing utilization practices, however, may permit later recovery of the seed trees.

Economic selective cutting.—Economic selective cutting removes the more valuable trees and leaves chiefly the smaller trees for one or more cuts in 10 to 50 years. It harvests most of the value in the first cut but leaves a small nucleus of residual timber for further growth and future harvest. The numerous small residual trees and relatively few scattered larger reserve trees comprise the seed source for natural regeneration. Cuttings of this general type often open stands sufficiently for establishment and development of reproduction. On the other hand, the smaller trees in even-aged larch—Douglas-fir stands are usually low in vigor and probably will grow poorly. They may also be generally undesirable as seed producers.

Shelterwood cutting.—The principal objectives in shelterwood cutting are to open the stand enough to induce even-aged larch regeneration and provide an adequate seed source to reproduce the stand in a minimum period of time. The total stand is removed in two cuts, with about half the volume taken in the first cut. Reserve trees are selected from the best-vigor, apparently mistletoe-free trees. The principal advantages of this method are believed to be (1) an adequate seed source, (2) best quality parent trees as a seed source, and (3) provision for harvesting seed trees in an attractive cut in 10 to 15 years. On the other hand, the risk of windthrow on some sites and the possibility of tolerant species, which may be undesirable, reproducing the area under the relatively heavy overstory, are possible disadvantages.

All three plots were logged by similar methods, with the same type of equipment and crew organization. Trees were felled and bucked by one- and two-man crews, using small one-man chain saws. Logs were jammer skidded near the roads and tractor skidded in locations beyond reach of the jammer. All the logs were loaded with a power-driven swing boom jammer. Three tractors, an Allis Chalmers HD-7, a Caterpillar D-4, and a Caterpillar D-7, were used for the tractor skidding and jammer and main haul road construction.

Cost Keeping

The study was based on gross cost and production figures. The operator recorded man-hours, machine hours, and materials costs in reasonable detail. Nevertheless, data obtained in the study are sufficiently detailed to permit determination of relative differences between cutting methods. These data represent cost values for the kind of crew and equipment organization used and conditions found in this particular operation.

Analysis of Cost Data

Cutting methods influence the cost of logging chiefly through their effects upon such physical factors as volume of material removed, size of trees cut, and the amount of defect included in the cut. Therefore the analysis was concerned first with the influence of volume, tree size, and defect upon cost. Then these effects were interpreted in the light of how the cutting methods affected these physical factors both in the present cut, and possible future cuts.

Effect of Cutting Method Upon Cost of Present Cut

The results of the study show that the seed-tree cutting was, in nearly all cost elements, the least expensive to log. Direct logging costs per M.b.m., adjusted for original stand differences, are summarized in Table 1. The economic selective and shelterwood cuts cost 30 and 50 percent, respectively, more than the seed tree cut. These cost differences reflect the direct effect of the cutting methods upon the physical factors, particularly volume removed per acre and the size of the trees cut.

Volume cut per acre.—The highest volume was cut in the seed-tree method, essentially a clear-cutting, where all but 4 or 5 seed trees per acre were removed. The economic selective cutting ranked next and the shelterwood cutting yielded the smallest cut. Volume cuts per acre, adjusted for differences in original stand, were 19.3, 12.3 and 9.2 M board feet, respectively. Costs averaged higher per M.b.m. where

TABLE 1.—SUMMARY OF DIRECT COSTS PER M.B.M.[1] ADJUSTED TO COMPENSATE FOR DIFFERENCES IN ORIGINAL STAND STRUCTURE AND DEFECT[2]

Cost Elements	Seed tree	Economic Selective	Shelterwood
	Dollars	*Dollars*	*Dollars*
Development costs (roads & landings)	1.11	1.64	2.37
Felling, bucking, and swamping	2.57	3.67	4.24
Skidding (exclusive of jammer and skid road construction)	3.20	4.12	5.00
Jammer and skid road construction	1.23	2.04	1.73
Loading	1.59	1.21	1.25
Supervision and miscellaneous	0.79	0.96	1.13
Maintenance and depreciation (general)[3]			
Social security, insurance, etc.	0.62	0.79	0.88
Scaling	0.18	0.23	0.29
Direct logging costs exclusive of transportation to mill	11.29	14.66	16.89

[1]All costs are based upon log scale.

[2]Total unadjusted direct logging costs exclusive of transportation to the mill for the seed tree, economic selective and shelterwood cuts were $11.04, $13.44, and $18.03, respectively.

[3]These costs are included in the equipment rates used.

smaller volumes were removed and lower where larger volumes were cut. For example, reduced volume cut in the economic selective and shelterwood cuts increased the cost of logging by $3.62 and $5.22 per M.b.m., respectively, over the cost of the seed-tree cutting (Table 2).

Size of trees.—The resulting differences in average size of trees cut on the three plots could, after adjustment for original stand differences, be attributed to the cutting system. The larger trees were removed by the economic selective cutting and the smaller by the shelterwood cutting, while the average size of the trees removed by the seed-tree cut was intermediate. Compared with the seed-tree cutting, the cost of logging the shelterwood plots was increased 38 cents per M.b.m. because of its smaller tree size (Table 2). On the other hand, the larger average diameter of the cut trees in the economic selective method caused a saving of 25 cents per M.b.m. over the seed-tree method.

Defect.—Defect increased the cost of logging although it did not significantly alter relationships between methods of cutting. The cost of felling cull trees, long butting, and handling defect in removing merchantable logs was determined in the unadjusted data. The following tabulation shows the amount of cull by cutting methods and the cost of handling cull material:

	Economic selection	Seed-tree	Shelterwood	Weighted average
Defect, percent	16.1	8.6	15.1	12.3
Cost of handling cull material, dollars per M.b.m.	0.86	0.54	1.22	0.79

The amount of defect was comparatively high in the shelterwood cutting because principally poor-vigor trees were removed, and these could be expected to be more defective than the average. Contrary to expectation, the percent of defect in the economic selective cutting was also high. This may be explained by the fact that trees in the 500-year age class, which tend to be highly defective, occurred more abundantly in that area and were, therefore, represented in larger numbers in the cut. The percent of defect was low in the seed-tree method because there were fewer trees in the 500-year age class in that stand.

TABLE 2.—EFFECT UPON LOGGING COSTS OF TREE SIZE AND VOLUME PER ACRE, USING SEED-TREE CUTTING AS THE BASE FOR COMPARISON

Method	Total cost Per M.b.m.	Saving or extra cost due to: Tree size	Volume Per acre
	Dollars	*Dollars*	*Dollars*
Seed tree (d.b.h. 18.6, cut 19.3 M.b.m.	11.29		
Economic selective (d.b.h. 19.2, cut 12.3 M.b.m.)	14.66	—0.25	+3.62
Shelterwood (d.b.h. 17.9, cut 9.2 M.b.m.	16.89	+0.38	+5.22

TABLE 3.—CURRENT LOGGING COSTS COMPARED WITH ESTIMATED COST OF REMOVING RESERVE IN ONE ADDITIONAL CUT[1]

Cutting	Economic selective: Net vol.	Av. d.b.h.	Direct logging cost[3]	Seed tree[2]: Net vol.	Av. d.b.h.	Direct logging cost[3]	Shelterwood: Net vol.	Av. d.b.h.	Direct logging cost
	M.b.m.	*Inches*	*Dollars*	*M.b.m.*	*Inches*	*Dollars*	*M.b.m.*	*Inches*	*Dollars*
Current	12.3	19.2	14.66	19.3	18.6	11.29	9.2	17.9	16.89
Second:									
In 10 years	8.8	16.1	15.67				12.3	18.1	12.78
In 15 years							12.8	18.4	12.35
In 50 years	12.8[4]	16.6	14.90						

[1]All costs are adjusted for original stand differences.

[2]Second cut not shown because it is assumed that the seed-tree area will not be relogged.

[3]Exclusive of transportation to mill.

[4]This volume includes 566 board feet of ingrowth or 11 board feet per annum in addition to 86 board feet per annum on reserve trees. Because of the shorter periods involved the other volumes shown in the table do not include ingrowth.

Probable Effect of Cutting Method Upon the Cost of Future Cuts

The effect of cutting methods upon logging costs cannot be completely appraised by a comparison of the cost of the initial harvest cuts only. Foresters have speculated that the cost of additional cuts in the reserve timber will be less because of the existence of improvements such as roads installed for the initial logging. So far the discussion has been concerned chiefly with the initial cut.

Further analysis has shown that the relative cost of additional cuts is related to the original cutting. The size and number of trees removed in the initial harvest largely determine what can be recovered in additional cuts. Growth also affects subsequent cuttings.

The study showed that logging costs in future cuts in the reserve timber on the economic selective cutting area will probably be as high or higher than in the initial cut (Table 3). The first cut took the larger trees and the greater part of the volume. The second cut, therefore, must come from the small reserve trees plus growth on them and ingrowth, if any. Some ingrowth will develop during the 50-year period, but ingrowth trees will be small and their contribution will amount to only 14 percent of total growth, or 11 board feet per acre per year. However, no ingrowth of merchantable size will develop during the 10-year period. Smaller sized timber and less volume in the future cuts than in the initial cut, therefore, will make future logging more expensive, despite the savings caused by existence of certain improvements.

On the other hand, the analysis showed cheaper logging costs for the second cut than for the initial cut in the shelterwood. The light initial cut (9.2 M.b.m.) left a large reserve volume of vigorous dominant trees. Hence, the future cut will contain larger trees and a larger volume than the initial cut, thus reducing the costs of logging.

The second cut will cost less in the shelterwood than in the economic selective cutting (Table 3). This disparity is caused by differ-

ences in volume and tree size and largely disappears when the cost of the initial cut and future cut are averaged, as shown in the following tabulation:

	Average cost per M.b.m.
Seed-tree cut	
Original cut only (19.3 M.b.m. cut)	$11.29
Shelterwood cut	
Original cut and reserve in 10 years (21.5 M.b.m. cut)	14.54
Original cut and reserve in 15 years (22.0 M.b.m. cut)	14.25
Economic selective cut	
Original cut and reserve in 10 years (21.1 M.b.m. cut)	15.08
Original cut and reserve in 50 years (25.1 M.b.m. cut)	14.78

However, logging by the seed-tree method remains the least costly at $11.29 per M.b.m. The future stand volume and cost of logging were not determined for the seed-tree cut because it is believed that the cost of logging such small volumes would be excessive.

Future logging costs are based upon current rates and dollar value.

Application

Cost of logging is one of several important factors which the forest manager must consider when selecting a method of cutting. Increased logging costs result in reduced stumpage returns to the landowner or in lower profits to the logger. Consequently, in the light of logging costs alone, the landowner and the logger would normally favor the seed-tree or clear-cutting method. However, before they can judge the merits of a cutting method, they should look at the whole problem. Some additional factors which should be considered are:

The cost of successfully regenerating the stand.—Seedbed preparation and other regeneration measures may cost more in partially cut stands with abundant reserve timber than in the more heavily cut stands. Heavy cutting is believed to be imperative for establishment and development of larch reproduction. On the other hand, artificial regeneration may be necessary under some conditions. Further studies are under way to shed more light on the regeneration phase of the problem.

Earning from or loss of reserve trees.—Reserve stands in the shelterwood system will probably grow best, especially in stands 180 years of age or younger, because the better-vigor and better-formed trees are left. The seed trees left in the seed-tree cutting may be lost because the cost of logging such small volumes is prohibitive and these trees may not survive until the next crop is harvested. Thus, the stumpage value of 1,500 to 2,000 board feet in seed trees must be charged to the cost of obtaining regeneration. The extra cost caused by the loss of seed trees might amount to about $21.00 to $28.00 per acre (at $14.00 per M.b.m. stumpage) or $1.00 to $1.50 per M.b.m. on the volume removed. The effect of growth and mortality of reserve trees is being studied in another phase of the experiment.

Special management objectives.—In some forests partial cutting may be used as a mechanism for balancing age-class distribution of timber or to harvest high-risk trees over large areas in advance of mortality. Thus silvicultural and business principles may have to be compromised to meet the management objectives. In addition, correlation with other land uses such as watershed management, wildlife management, and recreation may require further modification or special cutting methods.

The quality or value of the logs produced.—A complete analysis of the consequence of the marking would have required an evaluation of the logs because different kinds of marking affect the size and quality of logs produced. However, no log grading standards for larch in western Montana have been developed to provide for pricing the logs. Furthermore, an actual mill scale and lumber grade recovery study would have required work and facilities beyond those available for the project. Hence, readers should be mindful that the authors have not attempted to determine whether the logs from the different plots were of equal value at the mill. As pointed out, the economic selective cutting produced logs of somewhat larger size than the average, and the shelterwood cutting produced smaller than average size logs. In the second cut, the shelterwood should yield larger and probably better quality logs.

Summary

Analysis of the effect of the seed-tree, economic selective, and shelterwood cutting methods on logging costs in a larch—Douglas-fir stand showed that partial cutting increased the costs:

Initial cut.—The logging costs were lowest in the seed-tree cutting at $11.29 per M.b.m. (direct logging cost excluding cost of transportation to the mill.) The economic and shelterwood cuttings cost $2.37 and $5.60 per M.b.m. or 30 and 50 percent, respectively, more than the seed-tree method. Less volume per acre removed in these cuttings and smaller trees cut in the shelterwood cutting contributed principally to the added cost.

Future cut of reserve timber.—Estimates of costs of removing reserve stand in the economic and shelterwood plots in one additional cut in the future indicate that the decrease in improvement costs and increase in volume through reserve stand growth will probably not be great enough to offset the greater initial cost due to removing only part of the stand in the first cut. The average cost of removing the total merchantable stand in two cuts on the economic and shelterwood cuttings exceeded the cost of logging the seed-tree cutting even when the seed trees are considered lost and their stumpage value added to the cost of logging. Cutting methods, however, cannot be selected on the basis of logging cost alone. Other factors such as silvicultural requirements and cost of obtaining successful regeneration, earning from or loss of reserve trees, and special management objectives should also be considered.

Changing Economic Conditions and Forest Practices on Privately Owned Lands[1]

David T. Mason

Consulting forester, Mason, Bruce, and Girard, Portland, Ore.

Canadian and American foresters have the privilege of ringside seats at the greatest forestry show in history. The practice of forestry has had long, slow growth through the centuries in Europe. Here in these two countries it has grown to its present stature within a few decades —largely within the past ten years when the supply of timber available for annual cutting has become less than the demand.

THE subject assigned for this paper invites consideration of economic conditions affecting private forestry as they have been changing over the years. Since the beginning of the century five decades have been completed and the sixth well started. As a background I shall review for each decade what appear to be the outstanding factors affecting private forestry.

At the beginning of the 1901-1910 decade there existed only infinitesimal practice of forestry on private lands. In the United States, to which I shall confine my remarks throughout this paper unless otherwise indicated, there was then private forestry on the Biltmore Estate in North Carolina. The owners of a few other private properties, becoming curious about forestry, invited working plans made by the federal Bureau of Forestry. This decade, approximately, saw the beginning of the older forest schools; young men began to be trained in forestry and upon graduation practically all sought federal or state positions or work in the forest schools, the only fields then available. This was a period of beginning of forestry propaganda aimed at awakening the general public and private enterprise to the importance of forestry management. In 1905 the Bureau of Forestry became the Forest Service and took over administration of the national forests, which rather fully occupied its attention for many years thereafter. In this decade the most important development in private forest management was the establishing of cooperative fire protection associations, especially in the Pacific Northwest, in response primarily to the sound economic impulse of men to protect their own property; this work has expanded and grown in effectiveness to the present time; it helped greatly in securing compulsory forest protection laws in many states and in establishing also the protection of the public forests. This decade saw the peak of private acquisition of timber in the West and also the peak of creation of national forests—actually a race between the two until there was practically no public timber left outside the national forests.

In the 1911-1920 decade the completion of the Panama Canal enabled West Coast—that is the Douglas-fir region of western Washington and western Oregon—lumber products to compete successfully with southern pine on the East Coast. The First World War inflated the cost of West Coast lumber production by about 80 percent. West Coast stumpage at this time was so plentiful that its value increase from about 1907 to the mid-1920's amounted practically only to the effect of increased accessibility due to the earlier cutting of more readily available timber During the 1911-1920 decade there was improving and expanding protection of private forests from fire.

The 1921-1930 decade saw the beginnings of private forestry other than protection in the West and the expansion of such work begun earlier in the South and Northeast. During this decade some of the largest southern pine lumber companies, mistakenly overlooking enormous growth potentials and expecting early depletion of southern pine timber, migrated to the West; most of these went through financial reorganizations in the following decade. In the West they found, especially in the coast territory, vastly more of both private and public timber readily available for annual cutting than the lumber market could digest. Spurts of demand, as in 1923, temporarily made the lumber industry profitable, but expansion of plant facilities and of lumber production quickly brought the price of lumber back to the cost of production plus practically the 1913 stumpage value.

The 1931-1940 decade was the period of the great depression, extra severe in the forest industries throughout the country. For three successive years at its depth the demand for lumber for construction of homes—the main use for lumber —was only about 15 percent of the annual demand in the mid 1920's. During this decade in the western United States, timber purchases—when made at all—were made almost exclusively in retail lots for immediate cutting; there were practically no large wholesale timber transactions although great quantities were available at bargain prices. The wholesale values of timber sank to levels far below the 1913 values. Much private timber was tax delinquent and a considerable portion was forfeited into county ownership during this decade. Depression conditions destroyed or put in cold storage many of the private forest enterprises started in the previous decade. In 1904 Wisconsin, Washington, and Louisiana, in that order had been our greatest lumber producing states. In 1905 Washington had pulled far ahead of the others, and held the lead until 1938 when Oregon took first position, which it has held since. In this decade of the

[1]Paper presented at the S.A.F.—C.I.F. joint meeting, Montreal, Canada, Nov. 1952.

1930's the lumber code of NRA operated for a time with lasting aftereffect upon private forestry. This decade saw the beginning of the enormous expansion of the pulp and paper industry in the South—an expansion which continues at the present time. Late in this decade came the O & C[1] act for about 50 billion feet of accessible timber in western Oregon, placing its cut on a sustained yield basis.

With the 1941-1950 decade came the Second World War with its own great demand for forest products, and following the war great expansion in construction of homes, business and public buildings, and of the pulp, paper, and plywood industries. Timber values increased substantially during the war and then expanded further with elimination of price control of timber in November 1946. The Second World War, and conditions following, brought the tremendous inflation which appears all the greater because the effect of the First World War inflation had been rather thoroughly washed out during the great depression. This decade saw a reform of federal income taxation of importance to forest land owners. Also federal legislation authorized sustained yield forest management units. In this decade application of forestry practices on private land expanded enormously.

Now in the current decade the economic trends of the previous decade continue.

As a more concrete part of this review there are presented tables to show how with the years the production of lumber has shifted between regions in response to the supply of timber available for annual cutting.

Table 1 shows that in 1879 more than three-fourths of our softwood lumber came from the then ample, near-market forests of the Northeast and the Lake States, with less than a quarter, mainly for local use, being drawn from the relatively remote, enormous virgin timber supplies of the South and West.

[1]Oregon and California Railway revested land grant.

TABLE 1.—SOFTWOOD LUMBER PRODUCTION IN THE UNITED STATES[1]

Year	Total billions of feet board measure	Percent produced in		
		South	West	All other
1879	13.3	15.8	6.0	78.2
1889	20.0	21.0	12.5	66.5
1899	26.2	37.0	13.3	49.7
1909	33.9	50.4	24.2	25.4
1919	27.4	49.7	37.2	13.1
1929	30.8	41.2	52.0	6.8
1939	23.3	39.3	51.3	9.4
1946	26.5	35.1	54.0	10.9

[1]Based on U. S. D. A. 669—October, 1948.

TABLE 2.—SOURCE OF SOFTWOOD LUMBER CONSUMED IN UNITED STATES, INCLUDING EXPORTS[1]

Year	Total billions of feet board measure	Source of lumber, percent produced in					
		Southern pine region	Douglas-fir region	Western pine region	Redwood region	All western U. S.	All other
1929	28.9	36.6	35.6	17.3	2.1	55.0	8.4
1939	22.4	35.5	31.3	21.9	1.8	55.0	9.5
1946	25.8	34.9	30.2	22.8	2.0	55.0	10.1
1949	29.2	28.4	36.3	23.6	4.1	64.0	7.6
1951	31.3	27.1	36.6	23.3	4.5	64.4	8.5

[1]Based on National Survey of Lumber Demand and Supply, August, 1952. (Both exports and imports included)

TABLE 3.—SHIFTS IN LUMBER PRODUCTION WITHIN THE DOUGLAS FIR REGION[1]

Year	Total production in billions of board feet	Percent produced in	
		Western Washington	Western Oregon
1925	9.5	67	33
1940	7.6	52	48
1950	10.8	28	72

[1]Based on Census and Forest Service data.

By 1909, through depletion of Northeast and Lake States forests, the South had become the great source of national lumber supply, and remained in this leading position in 1919. Because of depletion in the South, the West had by 1929 gained the lead, which it has since held.

Table 2 gives a further view of trends especially within the West, and brings the data down to the present. It shows that from 1929 through 1946 there was not much shift—the West supplying about 55 percent, the southern pine region about 35 percent, and the remainder of the country about 10 percent of our softwood lumber. By 1951, however, the West had moved from 55 up to about 64 percent and the South had dropped from 35 to about 27 percent. Within the West the production of the Douglas-fir region has remained from 1929 to 1951 comparatively steady; the western pine region rose from about 17 percent in 1929 to about 22 percent in 1939, and has since been fairly steady; the redwood region was steady at about 2 percent from 1929 to 1946, then more than doubled to 4.5 percent in 1951.

Although the foregoing indicates steadiness of production for the Douglas-fir region, the actuality within the region has been quite different.

Table 3 shows that in 1925 western Washington was producing 67 percent and western Oregon 33 percent of the lumber of the Douglas-fir region. By 1950 the production of western Washington had dropped from 67 to 28 percent, and that of western Oregon had increased from 33 percent to 72 percent. This shift was partly due to depletion of much private timber

in western Washington and partly to the reduction of the quantity of timber available for annual cutting through the application of sustained yield forest management on practically all public and substantial areas of private forest land.

The national forests contain a large proportion of all the timber now standing in the West. This timber was, in effect, committed to sustained yield management with the creation of the national forests in 1905. However, these forests included generally the most inaccessible timber, so that only in quite recent years has there been sufficient demand for their timber to raise their actual annual cut well toward, but still below, their allowable annual cut on a sustained yield basis.

TABLE 4.—TIMBER LOGGED FROM NATIONAL FORESTS[1]

Calendar year	Total for all national forests in Oregon and Washington	Willamette National Forest in central western Oregon
	(Millions of feet, log scale)	
1930	466	12
1940	795	46
1950	1,885	266[2]

[1]Data from Forest Service.
[2]For fiscal year ending June 30, 1950.

Table 4 shows that from all of the national forests of Oregon and Washington there was logged in 1950 about four times as much timber as in 1930; from the Willamette National Forest in central western Oregon in 1950 there was logged about twenty-two times as much as in 1930.

In 1951 the writer studied the timber resources of the central one-third of western Oregon, an area of about seven million acres about three-quarters in forest land, carrying a total of about one-hundred billion feet of timber. The timber in this area is 70 percent in public ownership; this with sustained yield management is being cut at the rate of about 1.4 percent yearly. Of the private timber about half is being cut "slow bell," partly under sustained yield, at an average rate of about 2 percent yearly. The remaining half of the private timber is being cut at the rate of something more than 10 percent yearly; this part of the private timber is providing more than half of all of the cut of this area.

In my own experience in this central west Oregon area in the past fifteen years in the management of a substantial private forest property, in the course of which there has been much selling and buying of timber, I saw in the earlier years sawmills being built to cut the then more than ample supply of timber. In the later years many of these mills, short of timber, lacking equipment for close, refined utilization, and burning great quantities of sawmill waste, have been fading out entirely or moving to the last frontier of underdeveloped timber in the United States in southwest Oregon, in northwest California or in the Rocky Mountains. At the same time that ill equipped mills were folding up in this area, a few with longer assured timber supply have, in order to secure fully the values potential in the logs, been making considerable investment in dry kilns, in dry storage sheds, in equipment to make pulp chips from sawmill leftovers, in power plants to furnish their own steam and power needs — selling excess power to public utilities — thus completely utilizing the wood and bark of each log. Such mills can afford to, and do, utilize more closely the inferior species and the other wood in the forest, and because of their high investment seek to stretch their life to the maximum by building up and creatively managing forest properties and by log and timber buying.

In this review our attention has gradually shifted from the broad national scene to concentrate on the West Coast, for here, as I see it, is the decisive ground upon which the main battle between supply and demand has been going on for so many years.

Since the opening of the Panama Canal the chronic too-rapid cutting in relation to market demand for lumber of the once great excess supply of timber in western Oregon and in western Washington has been the supreme control on lumber prices and on timber values, not only in the West but throughout the United States, and in the world in general. This has also had a controlling effect upon the practice of forestry, especially on private lands. This determining fact of the world timber situation makes it worth while to tell more of the West Coast timber story. Obviously, present conditions differ greatly from those of a few years ago. The new situation has become clearly visible since the lifting of economic controls in late 1946. It is as though the controls of the war period were a blanket of fog hiding the transition from an era when timber in this region was in great surplus to a period when it is in short supply.

The Panama Canal and low cost water transportation opened the East Coast and world markets to a long-continued deluge of lumber from the great quantity of highly-accessible, high-quality, heavy-stand-per-acre, low-cost-of-operation, low-value timber of the West Coast. Production capacity in logging and sawmills was created much beyond lumber market requirements even for the good markets of the 1920's. The great depression of the 1930's heavily restricted market demand and brought great additional economic pressure for maximum production of lumber. There were huge quantities of private and public timber readily available for annual cutting many times exceeding annual market demand for lumber. Much of the private timber was tax delinquent, much was burdened with timber bond issues or other debt, much was in weak hands.

Timber owner operators in this difficult situation gave consideration to seeking government permission to maintain prices and to restrict cutting. Under the N.R.A. there was a short period of such economic controls which briefly aided recovery from the worst of the depression difficulty. Only the national forest timber was, by sustained yield policy, restrained from potentially rapid cutting; actually this timber was too inaccessible to be marketed at more than a fraction of sustained yield allowable cut. But there was a tendency to

place even his timber on the market which eventually was restrained by order of President Hoover. Such conditions, with low timber values, made for poor utilization in the woods and in the mills. Conditions were thoroughly discouraging for private forestry.

The lumber code of N.R.A. set up requirements for the practice of forestry on private land which paved the way for later events. A report resulting from the work under this code emphasized the importance of sustained yield forest management, with its limitation of annual cut, as a solution to American forest problems.

After the war the elimination of price ceilings disclosed vastly changed conditions. Much of the surplus timber had been cut. By act of congress the highly accessible 50 billion feet of O & C timber had been removed from unlimited annual cutting to a sustained yield policy with the annual cut established at 500 million feet. Much other publicly-owned or publicly-managed timber and much private timber also had been placed on a sustained yield production basis. Numerous operators with substantial timber reserves not yet willing or able to place their timber on a sustained yield basis had adopted the policy of "hoarding" their own timber, seeking to buy as much additional timber as practicable to build up their timber reserves and at the same time buying for current cutting as much public timber as practicable and as many logs as practicable and cutting the least possible of their own timber to furnish their mills with the currently needed supply of logs. Far sighted operators were holding their own cut land and were acquiring other cut land and young growth.

In this postwar period national demand for lumber for housing and for other uses has been large; per capita consumption of paper products has increased rapidly. The western plywood and pulp industries have increased their log requirements; in 1925 the volume of sawlog size timber going into pulp and plywood was about 4 percent as much as that going into lumber; by 1950 this 4 percent had increased to about 33 percent.

This combination of greater annual demand and reduced volume of timber available for annual cutting in the West Coast territory has resulted in a shortage of timber supply which has greatly increased prices for lumber, logs and other forest products and, of course also, for stumpage. The timber shortage and high prices have made it practicable to utilize timber much more closely in the woods and mills; they have made it possible to carry on relogging operations on lands previously logged. In prewar days there was little cutting of timber less than 100 years old, but now it is feasible to cut timber for sawmilling even as young as 50 or 40 years and even as small as 5 inches in diameter. This unfortunately is doing away with a great deal of young timber which should be saved for cutting after the exhaustion of the still enormous quantities of old growth timber in the region. Although on much public and private land timber cutting is being restrained to the sustained yield allowable annual cut, and on some other land timber is being "hoarded," it is still on the whole being cut so fast as to force progressive closing or migration of mills lacking in timber reserves.

This new, postwar West Coast condition is highly stimulating to the practice of private forestry, especially by the larger forest land owners who are more and more going into progressively more intensive forest management to protect heavy plant investment. Fire protection has been greatly improved. Timber is cut with an eye to securing reproduction. More and more seeding and planting is being done to hasten and increase the volume of the ultimate timber crop. Thinnings of young stands are beginning.

Twenty years ago the South appeared to be the most backward part of the country in private forestry. Then the pulp and paper industry, with its roots already well established, began to grow like Jack's bean stalk until in 1951 about 60 percent as much wood was going into pulp in the South as into lumber, and the pulp industry was using about seven times as much wood as in 1931. This huge expansion has required the creation of many large, intensively managed private forests to support the great investment in these pulp mills. This has placed the South in the forefront of private forestry in the United States. But even with the great area of highly productive forest land available, a recent study by the Forest Service indicates that still more intensive forestry must be practiced in the South to assure the pulp industry of adequate supplies of wood in the years ahead. However, this situation will be ameliorated, by the increasing use of hardwood for sulphate pulp. As part of a program of sound forest management many of these companies are each year cutting substantially less than the annual growth in their own forests in order to accumulate growing stock and thereby create larger future annual growth. The southern pulp companies, while obtaining part of their current wood supplies from their own forest lands, rely heavily upon wood cut from the land of other, usually small, owners. Such small owners are generally poor forest managers, but their mismanagement is lessened by strong efforts of pulp companies, county foresters and others to improve the management. The creation of these large, still expanding, pulp company forests has, by transferring much forest land from weak hands into strong, reduced possible threat of over cutting. These large private forests in the South, and in other parts of the country as well, in accordance with experience here and in Europe, may be expected on the average to operate under better management than the public forests and far better than the small private forests.

Many of the large private forests in the Northeast and Lake States, especially those owned by pulp companies, have had gradually improving forest management for many years.

A large proportion of all of the privately owned forest land in the country is in the hands of small

owners, much of it in farm woodlots. Some of this is tending to pass into the larger, better managed ownerships. Much of it will no doubt remain permanently as small holdings with its forest management gradually improving, but still generally inferior to the management of the large private and public forests.

In the lumber industry in the period prior to 1941 there was occasionally, as in 1923, a year or so of extra strong market demand for lumber bringing higher lumber prices and more profit; but with much timber available for annual cutting the profit quickly caused expanded production and reduced prices and profits. However, during the past several years, with profits constantly high, lumber production has expanded nationally, but not sufficiently for lumber supply to top demand and to reduce prices and profits. In the South lumber production declined somewhat; in the West it declined in the older producing localities, and increased over all only by expansion in the "last frontier" localities. This failure of high prices to bring large expansion demonstrated that reduced timber supply, application of sustained yield, and "timber hoarding," thus limiting the quantity of timber available for annual cutting, were putting effective brakes on lumber production. At the same time the high prices and profits were creating capital in important amounts available for the practice of private forestry.

Timber supply available for annual cutting in its new relation to market demand, with its effect on capital formation, has not been the only economic factor at work in recent years in stimulating private forestry. Before 1944 the federal tax laws, while providing that a seller of forest land or standing timber would be taxed on a capital gains rather than the higher ordinary income tax basis, provided that the operator of timber would be taxed on the ordinary income and excess profits tax basis. This was in effect a "law against forestry" for it put great pressure on forest and timber owners to sell rather than operate their timber; it tended to destroy some promising sustained yield forestry enterprises. The 1944 tax reform gave operators, also, the benefit of the capital gains tax. This has removed adverse economic pressure and leaves with such operators much more "keeping money" available for the building up of forest properties and the practice of forestry.

Another section of the Federal Revenue Act, with the purpose of forcing payment of taxable dividends, prohibits corporations from accumulating excess cash not needed in the business. For many closely held corporations in the forest industries this creates a strong incentive to invest in timber for future cutting rather than to pay dividends. This tends to place forest land in stronger hands interested in long term forest management.

In 1944 when the capital gains tax reform bill was on its way through Congress there was also under consideration but not enacted a proposal to permit charging as annual expense the money spent for forest development such as for roads, trails, planting, etc. Such a provision now in effect for oil wells has stimulated development of oil; the "President's Materials Committee" in its recent report has recommended that this provision be enacted for other forms of mining. A provision such as this for forests would strongly promote the practice of forestry.

At one time the ad valorem property tax was one of the chief obstacles to private forestry. With the inflation and the greater profits of recent years, timber values have increased more rapidly than assessed values and tax rates, thus for a while at least relatively lightening this burden on private forestry. However, property taxes and protection and management costs per acre have been rising, and are an incentive to the kinds of forestry work, such as planting, that tend to increase the per acre quantity and the unit value of, and to shorten the time to, the final crop.

Oregon, followed by some other states, has effective legislation requiring, in connection with the cutting of timber, measures such as the leaving of seed source or planting which will tend to secure reproduction on cutover lands. This is another stimulant to forestry on private land. This follows like legislation in some of the European countries where some go still further by prohibiting final cutting of immature stands.

The "Keep Green" movement, originating in the State of Washington, has had substantial effect in preventing fires. Fire protective organizations have improved greatly in suppressing fires. Organized fire protection has expanded to include most private forest land. All of this has increased the confidence of the forest owner in the practicability of forestry.

The "Tree Farm" movement has stimulated practice of private forestry by both large and small owners.

Increasingly investors, large and small, are putting money in trees, rather than in gilt-edged securities, believing such investment sound with the additional advantage of being a good hedge against inflation.

There is evident a greater willingness of the larger private forest owners to "plough back" profits into more and more intensive management of their forests; as in Sweden where legislative policy encourages capital formation, it appears possible that shortage of manpower rather than shortage of funds may eventually tend to limit this process of "ploughing back." This is one of the important reasons why the management of private forests excels that of public forests for which the "ploughing back" policy is generally not available.

Years ago one seeking cheap timber for investment could readily find plenty of opportunity within the United States. Now one has to look to underdeveloped foreign countries for cheap timber, but the distance and the stability of government of such countries is discouraging so that most investors prefer to pay higher prices here at home. Indeed, some foreigners because they consider our government more stable than their own,

are turning here for forest investment, and in some cases teaching us better forest management.

We have seen how the West Coast for many years cut its timber so fast as to handicap the practice of private forestry, not only in its own territory but throughout the United States and more or less throughout the whole world. This chronic flooding of the market with West Coast timber products has now ceased, with favorable effects upon its own and the national practice of forestry, both private and public. One wonders whether this is a temporary change in the West Coast territory or whether it is permanent. As I see it, excess timber supply available for annual cutting no longer exists except perhaps to a relatively small degree in Alaska and in the "last frontier" localities previously mentioned, where, however, most of the timber is publicly owned and committed to sustained yield management. Furthermore, throughout the United States we continue to use timber of sawlog size faster than it is reproduced by growth, thus continually reducing the possibility that a period of slack demand may even temporarily create a serious timber surplus. Those now owning most of the private timber in the United States are economically sufficiently strong to resist dumping it on a poor market. It appears likely, with our rising standard of living, our rapidly increasing population, and the continuing expansion of the pulp and some other forest industries, that under normal future conditions demand for forest products will readily absorb the supply available for annual cutting, which in future years continuously in larger proportion must come from managed forest lands rather than from virgin forests.

An important question affecting private forestry in the United States in future years is whether, with our domestic forestry house in order, we may be swamped with excessive supplies of timber from foreign sources much as we have been deluged with West Coast forest products in past years. A few tentative observations in this field may be in order. Our good friends in Canada have huge areas of forest land. It is my impression that limitation of annual cut on a sustained yield basis is already largely in effect and will not permit great expansion of production of forest products. Canada is now annually sending into the United States large quantities of forest products which we need and count on in at least present volume through sustained yield production in future years.

The forests of western Europe practically can no more than supply the needs of its own population on a sustained yield basis.

There are, as I see it, two great forest areas in the world from which forest exports might invade world markets in a really big way. Russia has a great area of softwood forests, larger than continental United States in area. Well-informed foresters who live near this area have told me that when Russia becomes sufficiently civilized to operate her forests at sustained yield capacity, her great population will need and hold at home all of the products of these forests. Also this is a region of slow growth, and transportation from most of these Russian forests to world markets would be costly.

The other great forest area in the world is the Amazon Basin. Its area, about that of continental United States, is smaller than the Russian forest area, but its warm climate and large annual rainfall give it a greater total forest growth potential than that of Russia. The Amazon has no softwood forests. It has great diversity of tree species, most of which do not float. Much of its area is flooded yearly. It has serious transportation problems. Its few inhabitants have had slight experience in logging and milling. Creation of large forest industries on the Amazon would involve a great social problem. Any large production from this area for world markets appears to be some distance in the future.

Each year we live in closer relations with the rest of the world. We have, therefore, great need to study and frequently review the problems of regional, national, and world timber supply and demand.

We have seen in the past decade in the United States the greatest expansion in the world's history in the application of forestry to private lands. This has resulted mainly from the final removal of the greatest obstacle, economic or otherwise — excess timber supply for annual cutting — and the creation of powerful economic pressures favorable to forestry. There appears to lie ahead in the coming quarter century further expansion of the pulp, plywood, laminated wood, hard board and wood chemical industries, partly offset by likely curtailing of the lumber industry, with more intensive utilization and refinement in woods and mills, and with far more intensive practice of forestry on private forest land.

They Received Forestry Degrees[1]

Joseph S. Illick
Dean Emeritus, State University of New York College of Forestry, Syracuse.

More than 24 thousand earned academic degrees in forestry have been awarded in the United States. The exact total was 24,200 as of June 30, 1952.

The first earned forestry degree granted in America was the Bachelor of Science in Forestry (B.S.F.). This original degree was awarded by Cornell University in 1900. Only one forestry degree was awarded that year, the recipient being the late Professor Ralph C. Bryant.

Number of Degrees in the Decade 1900-1909

The granting of forestry degrees in the United States started on a very small scale. The first year (1900) only one was awarded, the second year five, the third year eleven and the fourth year sixteen. In the fifth year the total rose to 39, and by 1909—the end of the first decade of forestry degree-granting in the United States—the annual total for forestry degrees had risen to 85 (Table 1).

The principal factor in the sharp annual increase in number of degrees granted during the latter half of this first decade was the rapid increase in the number of institutions that began offering forestry courses at the collegiate level. Prior to 1904, Cornell and Yale were the only two institutions of collegiate rank granting forestry degrees in this country. That year (1904) four additional institutions—Harvard University, Iowa State College, University of Michigan and the University of Nebraska—began awarding forestry degrees. By 1909 twelve educational institutions had conferred a total of 363 degrees in forestry.

Kind of Degrees Conferred in the Decade 1900-1909

Of equal importance, and in many ways of greater significance than the number of degrees, is the kind of forestry degrees conferred. During this initial decade of 1900-1909, there were nine different degrees given upon the satisfactory completion of the then prescribed training programs in forestry. The title of these degrees, the number conferred and the schools where given are listed in Table 3.

Of the nine original forestry degrees, all excepting two (Bachelor of Arts and Master of Arts) are still being awarded in 1952. However, three of the remaining seven original degrees are now awarded only on a limited or occasional basis. These three degrees are Bachelor of Forestry, Bachelor of Scientific Agriculture, and Forest Engineer. The Bachelor of Forestry degree is now (1952) awarded by only two forestry schools and the Bachelor of Scientific Agriculture and Forest Engineer degrees by only one forestry school each. It follows, therefore, that of the original nine forestry degrees only four remain in general use. These four degrees are:

- Bachelor of Science
- Bachelor of Science in Forestry
- Master of Forestry
- Master of Science in Forestry

Some Beginning Developments Regarding Forestry Degrees

Among the beginning or initial developments regarding forestry degrees in the United States are:

1897.—The first degree awarded to an American forester was an honorary Doctor of Laws (LL.D.) degree conferred on Bernhard E. Fernow by the University of Wisconsin. He was then Chief of the Division of Forestry, U. S. Department of Agriculture, later Dean of the original forestry college at Cornell University, and from 1907 to 1919 Dean of the Faculty of Forestry at the University of Toronto. Dr. Fernow was born and professionally trained in forestry in Germany. He became a naturalized citizen of the United States in 1883.

1899.—The first native-born American to receive an earned degree in forestry was John C. Gif-

Table 1.—Forestry Degrees Awarded in United States 1900-1909

Institution	Number of degrees awarded by years										
	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	Total
Cornell University	1	5	2	2	5		1	1			17
Harvard University					1	3	3	5	6	7	25
Iowa State College					1			2	2	1	6
University of Maine							4	3	2	7	16
University of Michigan					2	10	11		11	13	47
Michigan State College						1	1	3	3	6	14
University of Minnesota						1	4	1	1	2	9
University of Nebraska					3	2	4	3	2	4	18
Pennsylvania State Forest Academy (Mont Alto)							7	4	7	13	31
Pennsylvania State College										4	4
University of Washington										1	1
Yale University			9	14	27	28	19	25	26	27	175[1]
Total	1	5	11	16	39	45	54	47	60	85	363

[1]Almost fifty percent of all forestry degrees awarded during the first decade were conferred by the School of Forestry of Yale University.

Table 2.—Bachelor and Master Forestry Degrees Awarded 1900-1909

Year	Number of bachelor degrees	Number of master degrees
1900	1	
1901	5	
1902	2	9
1903	2	14
1904	10	29
1905	10	35
1906	30	24
1907	19	28
1908	24	36
1909	41	44
Total	144 (39.7%)	219 (60.3%)

[1]Presented at S.A.F.C.I.F. joint meeting, Montreal, Canada, Nov., 1952.

TABLE 3.—KIND OF FORESTRY DEGREES AWARDED 1900—1909

Degrees and schools where offered	Number of degrees awarded	
	By schools	*All schools*
Bachelor of Forestry (B.F.)		
Pennsylvania State Forest Academy (Mont Alto)	31	31
Bachelor of Science in Forestry (B.S.F.)		
Cornell University	6	
Harvard University	1	
Pennsylvania State College	4	
University of Maine	16	
University of Minnesota	9	
		36
Bachelor of Science (B.S.)		
Harvard University	10	
Michigan State College	14	
University of Nebraska	18	
		42
Bachelor of Scientific Agriculture (B.S.A.)		
Iowa State College	6	6
Bachelor of Arts (A.B.)		
Harvard University	1	
University of Michigan	17	
		18
Forest Engineer (F.E.)		
Cornell University	11	11[1]
Master of Forestry (M.F.)		
Harvard University	11	
Yale University	175	
		186
Master of Science in Forestry (M.S.F.)		
University of Michigan	30	
University of Washington	1	
		31
Master of Arts (A.M.)		
Harvard University	2	2
Total		363

[1]Does not include bachelor of forestry or forest engineer degrees awarded by Biltmore Forest School.

ford. He was awarded the degree of Doctor of Economics (D.Oec.) in forestry by the University of Munich, Germany.

1900.—The first earned forestry degree awarded in America was a Bachelor of Science in Forestry (B.S.F.) conferred by Cornell University.

1902.—First Master of Forestry (M.F.) degree conferred by Yale University.

1902.—First Forest Engineer (F.E.) degree conferred by Cornell University. It replaced the Bachelor of Science in Forestry degree awarded in 1900 and 1901.

1904.—First Bachelor of Science (B.S.) degree awarded to forestry candidates by Harvard University.

1904.—First Master of Science in Forestry (M.S.F.) degree conferred by University of Michigan.

1904.—First Bachelor of Scientific Agriculture (B.S.A.) degree in horticulture and forestry conferred by Iowa State College.

1905.—First Bachelor of Arts (A.B.) degrees in forestry awarded by Harvard University and University of Michigan.

1905.—First Master of Arts (A.M.) degree in forestry awarded by Harvard University. Only one such degree conferred in 1905. Another A.M. in forestry awarded by Harvard in 1907, then discontinued.

1906.—First Bachelor of Forestry (B.F.) degree awarded by Pennsylvania State Forestry Academy (Mont Alto).

1915.—First Master of Science (M.S.) degree awarded to a graduate in forestry by Pennsylvania State College.

1916.—First Master of City Forestry degree awarded by New York State College of Forestry. Two additional Master of City Forestry degrees awarded in 1917, then discontinued.

1918.—First Doctor of Philosophy (Ph.D.) degree in forestry conferred by New York State College of Forestry at Syracuse University. Degree authorized in 1916.

1920.—First Honorary Doctor of Science (D.Sc.) degree in forestry conferred by Syracuse University on recommendation of New York State College of Forestry. Recipient—the late Professor James W. Toumey.

1927.—First honorary Doctor of Forestry (D.F.) degree conferred by Michigan State College.

1947.—First earned Doctor of Forestry (D.F.) degree conferred by Duke University. Authorized in 1940.

1951.—First honorary Doctor of Forest Science (D.F.S.) degree conferred by North Carolina State College of Agriculture and Engineering.

Some Significant Trends in Forestry Degrees

Bachelor and master degrees in forestry have been awarded in the United States since 1900 and 1902 respectively. During the past half century there has been an almost complete reversal in the proportion of bachelor and master degrees awarded in forestry. Of the 363 forestry degrees awarded during the first decade (1900-1909) of forestry degree-granting, 219 (60.3 percent) were master degrees and 144 (39.7 percent) were bachelor or equivalent degrees. Since 1909 bachelor degrees have consistently outnumbered master degrees in some years by as much as 10 to 1. During the last decade (1943-52) 84.1 percent of all forestry degrees awarded were bachelor degrees, 14.7 percent master degrees and 1.2 percent doctor degrees. Of the 363 forestry degrees awarded by 12 different forestry schools operating during the first decade (1900-09), almost one-half, to be exact 175, all of them master of forestry degrees, were awarded by the Yale University School of Forestry.

The number of forestry degrees awarded annually since 1900—both undergraduate and graduate, on the whole has shown a general upward trend. However, within this overall upswing there have been at least two drastic declines and two significant upswings. The two drastic declines occurred during war periods. In 1918 and 1919 the total number of undergraduate degrees awarded by all the forestry

schools of the United States dropped to a low of only 65 and 53 degrees respectively. During these same two years, the total number of graduate degrees in forestry dropped to the alarming low of only six degrees. Again in 1945 the total number of undegraduate degrees in forestry dropped to a low of 51, from a previous high of 1,102 degrees only six years earlier in 1939.

The first big upswing in forestry degree granting began in the early 1930's, following the establishment and widespread operation of the Civilian Conservation Corps. In 1939 a total of 1,102 undergraduate degrees in forestry were granted and two years later in 1941, 117 master degrees were awarded. Both of these totals were then an all time high.

The second big upswing in the granting of forestry degrees occurred after World War II, with the unprecedented increase in enrollment of returned veterans under the provisions of the G. I. Bill. As a result a second high in forestry degree granting was reached in 1950, when a total of 2,321 bachelor, 275 master and 31 doctor degrees in forestry were awarded.

Within the short span of only five years from 1945 to 1950 the number of bachelor degrees awarded in the United States rose from a low of 51 to an all time high of 2,321. This was the most precipitous upswing in the history of forestry education in America.

Equally, if not more, significant, is the recent decline in bachelor degrees from 2,321 to 1,150 in the two-year period from 1950 to 1952. This current drop of more than 50 percent within a two year period is deserving of serious consideration by forestry educators.

It seems, however, that an equally significant development is the partial offsetting factor that in each of the six years from 1947 to 1952 more than 200 master degrees in forestry have been awarded. During the past decade the number of master degrees has risen from a low of 12 in 1944 to a high of 275 in 1950. Since 1950 there has been a slight drop in the number of master degrees awarded, but nothing comparable to the drastic drop in bachelor degrees during the same period.

The Doctor Degree Situation

The first earned doctor degree in forestry in the United States was awarded in 1918 by the New York State College of Forestry. Two such degrees were awarded that year, one in forest pathology and the other in forest chemistry. No additional doctor degrees in forestry were awarded in the United States until 1925. For more than twenty years following the conferring of the first earned doctor degree in forestry, the awarding of this degree moved forward at a very slow pace, in no year prior to 1934 exceeding ten in number. Until as recently as 1950, the number of doctor degrees granted in forestry did not exceed fourteen in any single year. That year (1950) 31 doctor degrees in forestry were awarded, which is still the record total.

In the thirty-five years from 1918 to 1952, a total of 240 doctor degrees were awarded in forestry. All except two of these degrees were Doctor of Philosophy, the other two being Doctor of Science. It is highly significant that of these 240 doctor degrees awarded during the past thirty five years, more than one-half were awarded during the past ten years. Equally significant is the fact that of the 3,593 master degrees in forestry awarded thus far, 1,395 (39 percent) have been awarded during the past six years. This unprecedented upswing in the granting of forestry degrees in recent years may become more understandable and significant by considering several comparative observations and findings.

Almost as many forestry degrees were granted during the past single decade (1943-1952) as were awarded during the four decades from 1900 to 1940.

Of the 24,220 forestry degrees granted thus far in the United States, more than one-half were awarded during the past twelve years (1941-1952).

More than one-third (to be exact 36 percent) of all forestry degrees conferred thus far in the United States, have been awarded during the past five years.

Today in the United States, one out of every two persons with a forestry degree is thirty six years or less in age. It follows, therefore, that the profession of forestry has again become a young man's profession, just as it was some fifty years ago, when professional forestry had its beginning in America. This may have a profound influence on the future development of American forestry.

Rapidly Growing Diversity in Forestry Degrees

In recent years there has developed a rapidly growing diversity in the forestry degrees awarded by the more than thirty forestry schools now operating in the United States. As previously mentioned nine different degrees in forestry were awarded during the first decade of forestry degree granting. Two of these original degrees have since been discontinued and three other degrees are now being used only occasionally or in limited numbers. This leaves only four of the original forestry degrees now in general use: (1) Bachelor of Science in Forestry (B.S.F.) (2) Bachelor of Science (B.S.) (3) Master of Forestry (M.F.) (4) Master of Science in Forestry (M.S.F.)

During the next three decades, that is from 1910 to 1939, only a few additional degrees were added to the original number. Among these additions were such degrees as Master of Science (1915), Doctor of Philosophy (1918), honorary Doctor of Science (1920), honorary Doctor of Forestry (1927), earned Doctor of Forestry (1947), and honorary Doctor of Forest Science (1951).

In recent years, and especially during the past decade, there have been many new forestry degrees awarded in this country. As a result a greater number and variety are being awarded in the United

States than in all the other countries of the world combined. Most of these degrees, largely the outgrowth of increased specialization in forestry education, are in the form of specifically and formally designated varieties of the bachelor of science and master of science degrees. The astonishing extent of this variation is shown in the following listing of forestry degrees granted in the United States from January 1 to June 30, 1952:

The tabulation in Table 4 is based upon reports submitted by all of the officially listed degree granting forestry schools in the United States. It shows that of the 1,150 bachelor degrees awarded in forestry during 1952 (up to June 30), 493 are Bachelor of Science in Forestry, 301 Bachelor of Science, and 6 Bachelor of Forestry. The total of these three long-used and generally accepted forestry degrees is 800, and comprises almost 70 percent of all the bachelor degrees awarded this year.

The remaining 350 bachelor degrees awarded during 1952 are covered by 27 different degree designations, ranging in number from a high of 49 Bachelor of Science-Forest Products and 43 Bachelor of Science in Forest Management to a low of only one degree each in Bachelor of Science-Fisheries and Wildlife and Bachelor of Science in General Studies (Forestry). Even a casual survey of the names and numbers of these 27 varieties of bachelor degrees in forestry shows very clearly and convincingly that thus far little has been achieved in codifying and standardizing the nomenclature of these degrees. Otherwise, there would not continue in use such slightly variable degree designations as Bachelor of Science-Forestry; Bachelor of Science, Forestry Option; and Bachelor of Science, Major in Forestry.

The Master degree shows almost as great a diversity in titles and lack of standardization as exists in the case of the bachelor degree. Of the 221 master degrees awarded this year, 94 are Master of Forestry, 46 Master of Science, and 14

TABLE 4.—FORESTRY DEGREES GRANTED IN UNITED STATES JANUARY 1 TO JUNE 30, 1952

Degrees and schools where offered	Number of degrees awarded	
I. BACHELOR DEGREES	*By schools*	*All schools*
Bachelor of Forestry		
Oregon State College	2	
Stephen F. Austin State College (Texas)	4	
		6
Bachelor of Science		
Iowa State College	38	
University of Massachusetts	8	
University of Michigan	5	
University of Minnesota	54	
Montana State University	45	
State University of New York, College of Forestry	129	
Oklahoma Agricultural and Mechanical College	22	
		301
Bachelor of Science in Forestry		
Alabama Polytechnic Institute	9	
University of California	65	
University of Florida	20	
University of Georgia	31	
University of Idaho	32	
Louisiana State University	23	
University of Maine	18	
University of Michigan	49	
Michigan State College	11	
Michigan College of Mining and Technology	23	
University of Missouri	23	
University of New Hampshire	21	
Pennsylvania State College	56	
Purdue University	45	
University of Washington	39	
West Virginia University	28	
		493
Bachelor of Science—Forestry		
Michigan State College	18	18
Bachelor of Science, Forestry Option		
Virginia Polytechnic Institute	10	10
Bachelor of Science, Major in Forestry		
University of Connecticut	7	
Louisiana Polytechnic Institute	12	
Stephen F. Austin State College (Texas)	3	
		22
Bachelor of Science—Forest Management		
Oregon State College	35	35
Bachelor of Science in Forest Management		
North Carolina State College	29	
Utah State College	14	
		43
Bachelor of Science, Major in Forest Management		
Colorado Agricultural and Mechanical College	14	14
Bachelor of Science in Wood Utilization		
Pennsylvania State College	11	11
Bachelor of Science, Major in Forest Utilization		
Colorado Agricultural and Mechanical College	4	4
Bachelor of Science, Major in Forest Utilization and Marketing		
Iowa State College	2	2
Bachelor of Science—Forest Products		
Michigan State College	41	
Oregon State College	8	
		49
Bachelor of Science in Lumber Products Manufacturing and Merchandising		
North Carolina State College	5	5
Bachelor of Science in Wood Technology		
University of Michigan	9	9
Bachelor of Science—Forest Engineering		
Oregon State College	14	14
Bachelor of Science in Wildlife Management		
University of Connecticut	3	
Utah State College	17	
State College of Washington	11	
		31
Bachelor of Science in Wildlife Conservation		
University of Maine	6	6
Bachelor of Science, Wildlife Conservation Option		
Virginia Polytechnic Institute	8	8
Bachelor of Science—Fisheries & Wildlife		
Michigan State College	1	1

TABLE 4 (*continued*)

Degrees and schools where offered	Number of degrees awarded	
	By schools	*All schools*
Bachelor of Science, Major in Game Management		
Colorado Agricultural and Mechanical College	7	7
Bachelor of Science, Major in Fish Management		
Colorado Agricultural and Mechanical College	4	4
Bachelor of Science in Range Management		
Utah State College	11	11
Bachelor of Science, Major in Range Management		
Colorado Agricultural and Mechanical College	4	4
Bachelor of Science in Agriculture (Range Management)		
State College of Washington	1	1
Bachelor of Science, Major in Grazing		
Colorado Agricultural and Mechanical College	4	4
Bachelor of Science, Major in Forest Recreation		
Colorado Agricultural and Mechanical College	7	7
Bachelor of Science—Land and Water Conservation		
Michigan State College	13	13
Bachelor of Science in Agriculture (Forestry)		
State College of Washington	16	16
Bachelor of Science in General Studies (Forestry)		
State College of Washington	1	1
TOTAL BACHELOR DEGREES		1,150
II. MASTER DEGREES		
Master of Forestry (M.F.)		
University of California	2	
Duke University	26	
Harvard University	1	
Louisiana State University	3	
University of Michigan	18	
University of Minnesota	6	
Montana State University	1	
State University of New York, College of Forestry	6	
North Carolina State College	3	
Pennsylvania State College	4	
University of Washington	4	
Yale University	20	
		94
Master of Forestry—Forest Management		
Oregon State College	4	4
Master of Forestry—Forest Engineering		
Oregon State College	1	1
Master of Forestry—Forest Products		
Oregon State College	3	3
Master of Forestry in Range Management		
Colorado Agricultural and Mechanical College	1	1
Master of Science (M.S.)		
University of California	2	
University of Michigan	5	
University of Minnesota	5	
University of Missouri	3	
State University of New York College of Forestry	27	
Pennsylvania State College	4	
		46
Master of Science in Forestry (M.S.F.)		
University of Florida	1	
University of Georgia	1	
University of Idaho	6	
Montana State University	2	
North Carolina State College	1	
Purdue University	3	
		14
Master of Science—Forestry		
Michigan State College	3	3
Master of Science—Forest Products		
Michigan State College	3	3
Master of Science in Wood Technology		
North Carolina State College	1	1
Master of Wood Technology		
University of Michigan	3	3
Master of Science in Wildlife Management		
Utah State College	7	
Virginia Polytechnic Institute	4	
State College of Washington	2	
		13
Master of Science in Wildlife Conservation		
University of Maine	3	3
Master of Science in Game Management		
Colorado Agricultural and Mechanical College	3	3

(*Continued on page 814*)

Master of Science in Forestry. These three generally accepted master degrees in forestry comprise 70 percent of the total awarded during 1952. The remaining 67 master degrees awarded this year are distributed among 20 different specifically and formally designated varieties, ranging in the number awarded all the way from a high of 13 Master of Science in Wildlife Management and 6 Master of Wildlife Management to a low of only one each of Master of Forestry-Forest Engineering, Master of Forestry in Range Management, and Master of Wood Technology.

There is considerably less diversity in the doctor degree than in the master and bachelor degrees in forestry. This is quite understandable because the doctor degree is less widely used and its requirements are more rigidly prescribed. Of the 240 earned doctor degrees in forestry awarded in the United States, from 1918 to 1952, all excepting 18 are earned Doctor of Philosophy degrees. Of the others, two are Doctor of Science (both awarded by University of Michigan), and sixteen are Doctor of Forestry (styled D.F. or D.For.) Only two institutions, Duke University and Yale University, are now awarding Doctor of Forestry as an earned degree. This degree was first awarded by Duke University in 1947 and the following year by Yale University. As of June 30, 1952 a total of 16 earned Doctor of Forestry degrees had been awarded, twelve by Duke and four by Yale.

Honorary Degrees in Forestry

Three years before the first earned degree in forestry was awarded in America, an honorary degree was conferred on an American forester. In 1897 the University of Wisconsin conferred the honorary Doctor of Laws (LL.D.) degree on Bernhard E. Fernow, then chief of the Division of Forestry of the U. S. Department of Agriculture. Four years later, in 1901, Yale University conferred the honorary Master of Arts (M.A.) degree on the late Gifford Pinchot and the late Henry Solon Graves.

TABLE 4 (*continued*)

Degrees and schools where offered	Number of degrees awarded	
	By schools	*All schools*
Master of Science in Forest and Game Management		
Louisiana State University	3	3
Master of Science in Fisheries		
University of Michigan	2	2
Master of Science—Fisheries and Wildlife		
Michigan State College	2	2
Master of Science in Fish Management		
Colorado Agricultural and Mechanical College	3	3
Master of Science in Range Management		
Utah State College	2	2
Master of Science—Land and Water Conservation		
Michigan State College	4	4
Master of Science in Conservation		
University of Michigan	5	5
Master of Science, Major in Forest Management		
Iowa State College	2	2
Master of Wildlife Management		
Montana State University	1	
University of Michigan	5	
		6
TOTAL MASTER DEGREES		221
III. DOCTOR DEGREES		
Doctor of Philosophy (Ph.D.)		
University of Michigan	7	
University of Minnesota	1	
State University of New York, College of Forestry	5	
Purdue University	1	
University of Washington	2	
Yale University	2	
Doctor of Forestry (D.F. or D.For.)		
None in 1952		
TOTAL DOCTOR DEGREES		18

Prior to 1920 only eleven honorary degrees in forestry were awarded. Since then, from 15 to 20 honorary degrees in forestry have been awarded each decade, that is, approximately two per year.

From the awarding of the first honorary forestry degree in 1897 to June 30, 1952, forty-nine persons have been the recipients of such degrees. The forty-nine persons thus honored received a total of seventy-three honorary degrees, a few of them having received from two to four, and one (Gifford Pinchot) being the recipient of seven honorary degrees.

The commonest honorary degrees awarded in forestry are Doctor of Science (D.Sc.) and Doctor of Laws (LL.D.). The newest honorary degree in forestry is Doctor of Forest Science (D.F.S.). Only two such degrees have been awarded, both by the North Carolina State College of Agriculture and Engineering. The first was awarded to Colin G. Spencer in 1951, and the second in 1952 to Dr. Carl A. Schenck, the founder and director of the Biltmore Forest School.

Conclusion

This report attempts to point out the nature and extent of the diversity in titles and requirements for forestry degrees, and the apparent lack of any effective attempt at standardization of degree terminology.

It is in no sense complete or conclusive. It is presented in this preliminary form with the hope it will kindle additional interest and bring forth further discussion on this and other important subjects in forestry education.

I venture the suggestion that consideration be given by the Division of Education to the appointment of a small committee to study this rapidly growing diversity in forestry degree titles and other special degree designations, now totaling more than 50 varieties, and to report on the advantages of establishing a more standardized and meaningful terminology for all forestry degrees.

Gunning for Loblolly Pine Cones

Collecting pine cones with a gun is not recommended to state forestry departments who reckon their needs in the thousands of bushels. And seed collectors would find it too hazardous for general use even if it were practical. But this method has proved effective and efficient for experimental work. After the foresters at the Tidewater Research Center in Virginia had encouraged loblolly pine seed trees to produce more seeds by injuring them and fertilizing them, two cones had to be collected from each of 400 trees to permit a check on results. The trees couldn't be cut because their seed production had to be rated for several years. Climbing irons couldn't be used because they injure trees too, and that would have complicated analysis of results. So, a .22 rifle with telescopic sight proved to be a good answer. Enthusiastic volunteers for the job of shooting cones soon found that 400 is a lot of trees, that twigs waving in a gentle breeze toss violently when viewed through a telescopic sight, and a rifle gets mighty heavy after a few hours—even a .22 rifle. But even though shooting cones isn't as exciting as hunting squirrels, the forester's lot looks to others like a happy one indeed, as he strolls through the woods with his gun when the cones ripen in the fall, looking for an easy single near the middle of the tree crown.

ROBERT D. MCCULLEY,
Tidewater Research Center,
Southeastern Forest Experiment Station.

Seasonal Browsing of Woody Plants by White-Tailed Deer in the Ridge and Valley Section of Central Pennsylvania[1]

W. C. Bramble and M. K. Goddard
Professors of forestry, The Pennsylvania State College, State College, Pa.

WHILE IT IS generally appreciated that, in an excessive population, deer will eat practically all common species of woody plants in the forests of Pennsylvania, as well as much other edible material (*4*), normal seasonal preferences in this region have not been reported (*2*). The present study shows definite seasonal preferences which are exhibited by deer in respect to woody browse species and the several definite seasonal browse patterns that exist where the deer population is about one deer to 50 to 75 acres. These seasonal preferences are considered important to many phases of deer management, in particular to range utilization inventories, and as a basis for improvement of range conditions.

Several studies have been reported from other regions which bear on the use of woody browse by deer in the winter season (*5, 7, 8*). In these reports the relative value of various browse species and deer preferences for certain species over others have been shown only for the critical winter period. Chapman (*3*), however, has shown how the use of 25 important deer foods varied in all seasons of the year in southeastern Ohio. The present study has also considered browsing throughout the year important in deer range management. Not only does browsing out of the winter season affect the vigor and condition of species used by deer in the winter, but it is also believed that a complete picture can only be obtained through a study of all seasons; woody browse is used throughout the year by deer in forest areas in Pennsylvania as a part of their normal staple diet.

[1]Authorized for publication on November 7, 1951, as Paper No. 1703 in the Journal Series of the Pennsylvania Agricultural Experiment Station. Paper No. 59 from the Pennsylvania Cooperative Wildlife Research Unit—Fish and Wildlife Service (U. S. Dept. Interior), The Pennsylvania State College, Pennsylvania Game Commission, and American Wildlife Institute, cooperating.

The Forest Area

The general area in which the present study was laid falls within the Ridge and Valley section of the Oak-Chestnut Forest Region (*1*), which extends from southern Tennessee northeastward to eastern Pennsylvania in a strip ranging from 40 to 80 miles in width. This strip lies between the Appalachian Plateau to the west and the Blue Ridge Mountains to the east, extending northeastward into Pennsylvania beyond the Blue Ridge Mountains nearly to the Delaware River.

The specific location of the study area in central Pennsylvania is in the Seven Mountains where the folded ridges and narrow valleys are for the most part covered with oak forests. Chestnut oak communities are typical of the ridge crests and upper slopes. Restricted hemlock-birch communities dominate rock slides near the tops of the ridges where organic material has collected among the boulders. Below the chestnut oak communities, a white oak-hickory community forms the typical forest of lower slopes and valleys. In the narrow mountain ravines, and along streams, a hemlock-rhododendron community appears where moisture conditions are favorable. A mesophytic community of hemlock-white pine-northern hardwoods occurs in the valleys along streams and in wet bottoms.

All these forest communities occur in rather close proximity to each other and are parts of the normal yearly range of deer in the area. Although the chestnut oak and white oak-hickory forest communities occupy the greatest land area, the smaller communities are also very important component parts of the habitat of deer. Throughout the year, deer range the ridges, ravines, and narrow valleys in search of browse and cover, and only under exceptionally severe winter periods of short duration do they tend to concentrate in hemlock-rhododendron thickets. Probably the greatest deer concentrations are in connection with the farmlands which lie adjacent to forest lands and to which deer tend to move in the winter in search of food.

Study Method

The permanent sample plot method developed by Deen (*6*) was used in obtaining data presented in this paper. Monthly readings were taken from 1936 to 1941 on 242 plots, 1 to 2 milacres in size. These plots were distributed through representative areas of the major forest communities common to the area and in places frequented by deer. Common woody species were represented on at least 5 to 10 plots. The average population of the entire area was approximately one white-tailed deer per 50 to 75 acres, a population which appeared conducive to moderate browsing of woody plants, and thereby, to detection of normal food preferences.

Tally of browsing was done between the first and tenth days of each month by counting the number of twigs eaten during the month. Each twig counted was cut with a sharp knife to avoid recounting the same twigs the following month.

Inventories, consisting of a count of all twigs by species on each plot, were made in November and June. Totals thus obtained were used as a basis for calculation of percentage of twigs utilized by deer (Table 1).

Seasonal Browse Preferences

The results of five years of study have been summarized in Table 1 which presents browse data by months and by seasons, the latter based on phenological observations in the region. The percentages given in Table 1 were obtained by dividing the number of twigs eaten of each species by the number of

TABLE 1.—AVERAGE UTILIZATION BY SEASONS OF COMMON WOODY PLANTS IN THE RIDGE AND VALLEY SECTION OF CENTRAL PENNSYLVANIA. DATA TAKEN FROM 1936 TO 1941

Species	Percent utilization: Spring April-May	Summer June-Sept.	Fall Oct.-Nov.	Winter Dec.-Mar.	Total No. Plots
Striped maple (*Acer pennsylvanicum*)	0.4	Trace[1]	0.8	12.4	16.4
Red maple (*Acer rubrum*)	0.5	Trace	1.0	6.1	130.3
Speckled alder (*Alnus incana*)	0.3	Trace	0.5	1.1	10.7
Smooth alder (*Alnus rugosa*)	0.2	2.8	Trace	2.0	4.0
Juneberry (*Amelanchier canadensis*)	13.0	5.1	0.6	8.4	23.0
Spicebush (*Linder benzoin*)	0.4	0.4	8.2	0.9	18.7
Black birch (*Betula lenta*)	1.4	1.7	0.3	2.9	42.6
Yellow birch (*Betula lutea*)	2.5	8.8	Trace	0.2	11.6
Hornbeam (*Carpinus caroliniana*)	0.0	2.3	0.0	0.0	2.0
Hickories (*Carya* spp.)	0.8	5.6	0.0	2.7	14.7
Chestnut (*Castanea dentata*)	1.2	0.7	0.2	2.5	34.5
Flowering dogwood (*Cornus florida*)	3.6	1.6	0.4	7.5	29.9
Hazelnut (*Corylus* spp.)	0.0	0.2	0.0	0.1	10.9
Hawthorns (*Crataegus* spp.)	0.3	3.1	1.1	2.1	27.7
Beech (*Fagus grandifolia*)	0.0	0.2	0.2	0.0	6.1
White ash (*Fraxinus americana*)	2.5	5.6	0.0	0.3	30.6
Teaberry (*Gaultheria procumbens*)	0.0	0.1	0.2	Trace	22.3
Huckleberry (*Gaylussacia baccata*)	Trace	Trace	Trace	Trace	35.6
Witch-hazel (*Hamamelis virginiana*)	0.8	0.1	0.1	3.0	112.5
Black alder (*Ilex verticillata*)	0.8	1.0	0.5	0.0	15.2
Butternut (*Juglans cinerea*)	0.7	Trace	0.0	3.5	15.0
Mountain laurel (*Kalmia latifolia*)	Trace	0.1	Trace	Trace	82.6
Tulip-tree (*Liriodendron tulipfera*)	2.6	1.3	0.8	5.6	19.5
Cucumber-tree (*Magnolia acuminata*)	4.9	1.0	0.0	9.5	9.4
Sweet-fern (*Comptonia peregrina*)	1.5	0.0	0.0	0.1	4.3
Black gum (*Nyssa sylvatica*)	2.3	5.3	1.1	2.8	46.6
Pitch pine (*Pinus rigida*)	0.7	0.0	0.0	4.2	11.5
White pine (*Pinus strobus*)	0.9	0.0	0.0	Trace	23.7
Large toothed aspen (*Populus grandidentata*)	1.9	2.1	0.5	1.5	13.8
Fire-cherry (*Prunus pennsylvanica*)	2.1	2.5	0.0	8.3	3.5
Black cherry (*Prunus serotina*)	0.9	0.2	0.0	2.8	13.3
Virginia creeper (*Parthenocissus quinquefolia*)	0.7	3.0	0.0	0.0	19.6
Apple (*Pyrus* spp.)	2.7	0.3	0.2	0.0	8.7
White oak (*Quercus alba*)	4.2	2.0	0.3	2.5	44.9
Red oak (*Q. borealis*)	2.2	1.5	0.3	2.5	55.8
Scarlet oak (*Q. coccinea*)	1.9	1.0	0.2	3.4	33.1
Scrub oak (*Q. ilicifolia*)	0.1	Trace	Trace	0.4	16.0
Chestnut oak (*Q. montana*)	2.0	0.9	0.3	5.4	60.3
Black oak (*Q. velutina*)	0.1	0.1	0.2	2.1	22.8
Rhododendron (*Rhododendron maximum*)	0.5	0.0	0.0	1.5	28.8
Azalea (*R. nudiflorum*)	0.0	0.6	0.4	0.2	28.3
Dwarf sumac (*Rhus copallina*)	0.9	0.2	4.4	20.7	15.3
Smooth sumac (*Rhus glabra*)	3.6	0.3	2.8	11.4	7.0
Gooseberry (*Ribes rotundifolia*)	0.1	0.2	0.3	0.5	10.0
Wild roses (*Rosa* spp.)	1.3	0.6	0.9	0.0	16.3
Blackberry (*Rubus* spp.)	0.5	1.0	0.3	0.4	78.9
Elderberry (*Sambucus canadensis*)	6.1	17.2	2.3	0.0	6.5
Sassafras (*Sassafras albidum*)	1.1	5.2	0.3	0.1	76.9
Greenbrier (*Smilax rotundifolia*)	7.5	10.9	0.9	0.0	63.2
Eastern hemlock (*Tsuga canadensis*)	0.1	0.0	0.0	0.5	14.9
Slippery elm (*Ulmus fulva*)	1.7	3.2	0.0	0.3	5.7
Blueberry (*Vaccinium angustifolium*)	0.0	Trace	Trace	Trace	48.2
Deerberry (*Vaccinium stamineum*)	0.2	0.0	Trace	0.0	21.9
Blueberry (*Vaccinium vacillans*)	0.1	Trace	Trace	0.1	91.1
Arrow-wood (*Viburnum acerifolium*)	2.2	2.9	1.2	0.0	19.2
Grape (*Vitis* spp.)	1.6	3.1	0.0	0.1	28.8

[1] Trace: less than 1 percent.

TABLE 2.—SEASONAL PREFERENCES EXHIBITED BY WHITE-TAILED DEER IN THE OAK-HICKORY FOREST AREA OF CENTRAL PENNSYLVANIA

Relative utilization	Spring	Summer	Fall	Winter
Heavy (5 to 20 per cent)	Juneberry Greenbrier Elderberry	Elderberry Greenbrier Yellow birch White ash Hickories Black gum Sassafras Juneberry	Spicebush	Dwarf sumac Striped maple Smooth sumac Cucumber tree Juneberry Fire cherry Flowering dog wood Red maple Tulip tree Chestnut oak Pitch pine
Medium (2 to 4.9 per cent)	Cucumber tree White oak Flowering dog wood Smooth sumac Apple Tulip tree Yellow birch White ash Black gum Red oak Arrow-wood Fire cherry	Slippery elm Hawthorn Grape Virginia creeper Arrow wood Fire-cherry Large-toothed aspen White oak	Dwarf sumac Smooth sumac Elderberry	Butternut Scarlet oak Witch-hazel Black birch Black gum Wild blackberry Hickories Chestnut White oak Red oak Hawthorn Black oak
Light (trace to 1.9 percent)	Chestnut oak Large-toothed aspen Scarlet oak Sweet fern Black birch Chestnut White pine Black cherry Dwarf sumac Witch-hazel Hickories Butternut Pitch pine Virginia creeper Red maple Striped maple Spicebush Speckled alder Hawthorns Scrub oak Black oak Huckleberry Mountain laurel Slippery elm Grape Wild rose Sassafras Rhododendron Blackberry Deer berry Gooseberry E. hemlock Blueberry	Black birch Flowering dog wood Red oak Tulip tree Black alder Cucumber tree Scarlet oak Chestnut oak Chestnut Spicebush Apple Hazelnut Beech Black cherry True winter-green Witch-hazel Mountain laurel Striped maple Red maple Speckled alder Huckleberry Butternut Scrub oak Blackberry Azalea Wild rose Smooth sumac Dwarf sumac Black oak Blueberry	Hawthorn Black gum Red maple Striped maple Tulip tree Juneberry Speckled alder Black alder Large-toothed aspen Flowering dog wood Black birch White oak Red oak Chestnut Beech Teaberry Apple Witch-hazel Yellow birch Huckleberry Mountain laurel Pitch pine White pine Arrow-wood Wild rose Greenbrier Azalea Chestnut oak Gooseberry Blackberry Sassafras Scarlet oak Black oak Scrub oak Blueberry Deer berry	Large-toothed aspen Rhododendron Speckled alder Spicebush Gooseberry E. hemlock Scrub oak Blackberry White ash Slippery elm Yellow birch Azalea Hazelnut Sweet-fern Sassafras Blueberry Teaberry Huckleberry Mountain laurel White pine
None	Hazelnut Beech Teaberry Black alder Azalea Blueberry	Sweet fern Pitch pine White pine Rhododendron E. hemlock Deer berry	Hazelnut White ash Hickory Butternut Cucumber tree Sweet-fern Fire-cherry Black cherry Virginia creeper Rhododendron E. hemlock Slippery elm Grape	Grape Beech Black alder Virginia creeper Wild rose (spp.) Elderberry Greenbrier Deerberry Arrow-wood

twigs of that species available; the first figures were obtained by monthly counts of twigs and leaves browsed, the latter by semi-annual inventories.

It is of special interest to note that in the area studied, maximum browsing resulted in but a 5 to 20 percent utilization, not an excessive value compared to other areas (5). The species included on the study plots are all common to the forest area studied and, together, represent the chief sources of woody browse available to deer.

The species preferred by deer in various seasons are listed in Table 2, where 5 to 20 percent represents the heaviest degree of utilization and 2 to 4.9 percent represents moderate browsing. Although species browsed in these two classes are considered preferred species and usually represent the bulk of woody browse taken by deer under normal conditions, the relative abundance of each species varies with the type of plant community, so that a true picture of amounts used could be obtained only by comparing utilization with the abundance of any given species in its characteristic community. For example, flowering dogwood is abundant in the white oak-hickory community, particularly when opened by cuttings, or in early successional stages on white oak-hickory sites; while in the chestnut oak community, flowering dogwood is sparse or absent. Therefore, an equal percent utilization by deer in the two communities would lead to different amounts of browse taken.

When a comparison is made between the species reported in Table 2 as browsed moderately to heavily in the winter season with reports of other studies, certain species stand out as favored by deer over a wide geographic range. These species are red maple (*3, 4, 5, 7, 8*), flowering dogwood (*3, 4, 7, 8*), sumac (*3, 4, 5*), black birch (*4, 7, 8*), witch hazel (*4, 7, 8*), black cherry (*4, 7, 8*), white oak (*4, 5, 7*), red oak (*4, 5, 7, 8*), and striped maple (*4, 7, 8*). Such agreement is of interest primarily because it indicates that certain species are pre-

ferred by deer over a wide spread of their range; and that those species merit attention when preferred lists are drawn up. But lack of agreement does not preclude other species from preferred lists and does not mean that species preferred in one forest region will also fall in that status in another region. Certain woody plants used heavily by deer under one set of habitat conditions may be eaten lightly in a different habitat in the same general region. For example, sweet-fern has been eaten heavily in the winter by deer in the scrub oak barrens (2), but is used lightly in the Seven Mountains a few miles away.

Of special interest in connection with seasonal browsing are the general seasonal patterns represented. These have been grouped into three types revolving around the critical winter season and are illustrated in Figure 1. The first is composed of species which are browsed moderately to heavily only in the winter. Striped maple, red maple, pitch pine, and chestnut oak are most prominent of this group. The second type includes species browsed moderately to heavily in other seasons as well as in the winter. Juneberry, flowering dogwood, tulip-tree, cucumber, fire-cherry, and sumac are typical of this group. The third type, species browsed lightly or not at all in the winter, is represented by such species as white ash, mountain laurel, and beech.

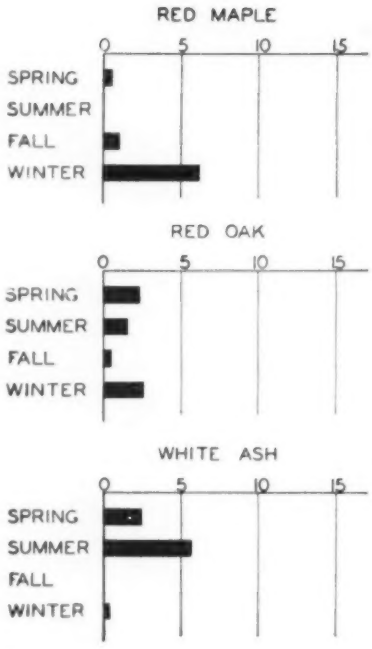


FIG. 1.—Seasonal browse patterns of species eaten by deer. Red maple browsed heavily in winter, only; red oak browsed heavily in winter, and in other seasons as well; white ash browsed lightly in winter.

Value of Browse Preferences to Deer Management

Although data in this paper are intended to bear only on preferences shown by deer and not on amounts taken, browse preferences are the first steps toward an analysis of amounts used, and will be followed by range inventories. When these have been taken, a knowledge of preferred browse becomes important in evaluating the normal carrying capacity of the range.

In examining an area to determine the extent of utilization of woody browse by deer, a knowledge of preferred species for the season of observation may be extremely helpful. For example, cutover areas of white oak-hickory examined in the winter shows moderate to light browsing of flowering dogwood, red maple, and smooth sumac, and very little browse on species such as blackberry, sassafras, and low blueberry. The examiner, fore-armed with the knowledge that the three species being eaten are preferred species, can properly evaluate the degree of use of the range by deer. In this case usage would lie within the carrying capacity of the area.

Exactly to what degree preferred winter browse species can be utilized by deer and still remain vigorous is not definitely known. And although reasonable estimates can be made after several years' observation, or from practical experience with the plants in question, certainly the next step following the analysis of seasonal preferences and quantities available is a determination of the degree of utilization which will safely permit continuous range productivity. Entering into this picture and often of greater importance than utilization by deer, however, is the effect of stand development on vigor of lesser vegetation. In the transition from the brush stage of cutover areas to sapling stands, the effect of crown closure and competition on available browse has been more important in the Seven Mountain area than overbrowsing by deer. While a few localized exceptions to this have occurred when deer population exceeded reasonable bounds and the deer destroyed browse plants by over-use, such cases are rare except in preserves, or other restricted areas where the yearly kill of deer is too light to keep the population in proper balance with its environment. Properly distributed and continuous cuttings are the key to good range conditions.

Summary

A five-year study of the seasonal browse preferences of white-tailed deer was made in the ridge and valley section in central Pennsylvania. Distinct and consistent preferences were shown by deer so that a table of preferred species could be drawn up for the various seasons of the year. Three types of seasonal pattern were recognized in respect to the vital winter season: (1) species browsed heavily only in the winter, (2) species browsed heavily in other seasons as well as winter, (3) species browsed lightly in the winter. A knowledge of seasonal preferences are needed for proper evaluation of range inventories in any forest region and are basic to management of deer range.

Literature Cited

1. BRAUN, E. LUCY. 1950. Deciduous forests of eastern North America.
2. BRAMBLE, W. C. and M. K. GODDARD. 1943. Seasonal browsing of woody plants by white tailed deer in the bear oak forest type. Jour. For. 41:471-475.
3. CHAPMAN, F. B. 1939. The white-tailed deer and its management in southeastern Ohio. Trans. Fourth North American Wildlife Conference 257-267.
4. CLEPPER, H. E. 1931. The deer problem in the forests of Pennsylvania.

Penna. Dept. Forests and Waters. Bul. 50.
5. DALKE, P. D. 1941. The use and availability of the more common winter deer browse plants in the Missouri Ozarks. Trans. Sixth North American Wildlife Conference 155-160.
6. DEEN, J. L. 1938. Methods of studying browse preferences of deer. Trans. Third North American Wildlife Conference 256-260.
7. HOSLEY, N. W. and R. K. ZIEBARTH. 1935. Some winter relations of the white-tailed deer to the forests in north central Massachusetts. Ecology 16:535-553.
8. PETRIDES, G. A. 1941. Observations on the relative importance of winter deer browse species in central New York. Jour. Wildlife Management 5:416-422.

Post-War Forestry in Western Europe[1]

Part III.—Forestry Education and Research in Four European Countries

Stephen H. Spurr
Professor of silviculture, University of Michigan, Ann Arbor.

FORESTRY SCHOOLS and experiment stations in west-central Europe date back well over a hundred years. They served as models for the similar institutions in the United States, and trained many of the first generation of American foresters. The present report on a brief but intensive tour through England, Scotland, France, Switzerland, and Germany is designed to give a brief picture of post-war education and research in forestry in these countries.

Forest Education

The American forestry school professor should feel quite at home in the typical European forestry school. They have much the same type of faculty and student body, courses, field trips, and even the same musty collections of forest products and tree cross-sections. There are, however, a few major differences.

The European professional forestry course consists largely of concentrated training in the broad field of forest management, covering three to four years. Wood utilization and forest product courses are not given the emphasis they receive in the United States. Furthermore, the curricula contain few courses not directly related to forestry. The argument here is that European secondary education is more thorough than in America, and that, consequently, there is no need for continuing general education on a college level.

The student bodies are kept small by limiting the numbers admitted. The general atmosphere thus tends to be one of a small scholarly community rather than one of a mass-production factory.

Great Britain

Britain has four forestry schools —at Oxford, North Wales (Bangor), Edinburgh, and Aberdeen. Oxford, the largest, has a fine new building with the various offices finished and furnished with select tropical woods from the various colonies. Princess Margaret officially opened the building in October, 1950. The undergraduate work here is heavily supported by St. John's College, and the graduate work (The Imperial Forestry Institute) by the British Government. The Imperial Forestry Bureau, which publishes *Forestry Abstracts*, is also located in Oxford, but is an independent entity.

Aberdeen will serve as an example of forestry education in Britain. The Department of Forestry occupies a post-war modernistic granite building attractively set in the Botanical Garden of the most northern of the four Scottish universities. It is headed by Professor H. M. Steven. The title "professor," incidentally, is generally restricted in Europe to the head of the department or "institute" as it is called in the Germanic countries. The rest of the staff consists of a reader, two lecturers, and assistants. The first year's work consists of training in basic sciences: botany, zoology, natural philosophy, and chemistry. During the second year, science courses are continued with geology, meteorology, forest chemistry; while forestry work is begun with silviculture, surveying, protection, and mensuration. During the final year, the work consists of silviculture, management, policy, utilization, forest zoology, and forest engineering. Field trips are taken through the forests of Scotland, England, France, and other west European countries during the various vacations, and six months of experience in forest work is also required for graduation. The English forestry schools are influenced rather strongly by silvicultural and management practices in France.

Employment for graduates is limited by the newly-won independence of India and Burma. Places had to be found for all the British foresters from these countries, and one runs into these men everywhere in Britain today. With India and Burma closed to British foresters, and with most of the Dominions training their own men, most present-day graduates either go to work for the Forestry Commission in Britain itself or enter the Colonial Forest Service. Fortunately, the rapidly expanding forestry program in Britain can use quite a few men.

Switzerland

The forestry school in Switzerland is located at the Eidgenossische Technische Hochschule (The Swiss Federal Institute of Technology) at Zurich, the only federal institution of higher learning in Switzerland. The forestry curriculum requires three and one-half years and is similar to that described for Aberdeen. The school is divided into four institutes or departments, each of which is head-

[1] *Part I.—England and Scotland*, appeared in Vol. 51, No. 3, and *Part II.—Germany, Switzerland, and France*, in Vol. 51, No. 6, of the JOURNAL OF FORESTRY. Scientific Series Paper No. 2706, Minn. Agric. Expt. Sta., University Farm, St. Paul.

ed by a professor. Three of these chairs are German, with the professor lecturing in German; and one is French, with the professor lecturing in that language. Elsewhere in the university, lectures are given in Italian, the third official language of Switzerland, and in English. The language requirements of the various chairs sometimes result in amusing situations, as when a distinguished French-speaking forester was appointed to a German language chair and was therefore required to lecture even his French-speaking students in the German language which he never really mastered.

The forestry school at Zurich has an excellent school forest of 519 acres on a small mountain, the Uetliberg, 2,750 feet high, immediately adjacent to the city. All parts can be easily and quickly reached by a mountain railway—trolley-car style—which takes tourists to the mountain top for a view of Zurich Lake and the Alps. A great deal of work has been done on this tract, and two recent numbers of Swiss journals[2] contain a series of articles dealing with it. An excellent mimeographed description in English is also available.

As in all Swiss forests, silviculture is based to a high degree upon ecological principles, and the natural vegetation that would be reached by normal succession is generally favored, although a certain percentage (between 25 and 50) of economic species is also desired. Records are based upon the "method of control," or the continuous inventory system as it is sometimes called in America. All trees are calipered at 6-year intervals.

Germany

In Germany, there are four forestry schools currently operating in the Western zone—at Munich, Freiberg, Hann.-Münden, and Hamburg. The school at Giessen, said to be the oldest in the world, was a war casualty. Over in the eastern zone, the famed schools at Eberswalde and Tharandt are apparently reduced to a low status, and cannot now be considered as professional schools.

The forestry school at Hannoverisch-Münden will serve to illustrate the German forestry school. Technically, this institution is known as the Faculty of Forestry of Georg-August University at Göttingen. There is a good chance that the forestry work will be moved the twenty miles to Göttingen and coordinated with the rest of the University. In the meantime, it occupies old but adequate buildings in an old undamaged town named for the junction where the Werra and Fulda rivers join to form the Weser.

The faculty consists of a Dean (Dekan); six other full professors (Ordentliche Professoren), each of whom heads a department or institute; three other professors (Ausserplanmassige Professoren); and three junior staff members (Dozenten). As with Aberdeen and Zurich, the three year course emphasizes natural sciences basic to forestry for the first half, and silviculture, management and other professional courses for the second. Following graduation, several years of apprenticeship are necessary before the students can take the examinations of the various state forest services. Chances for employment at the moment are very poor. Practically all east German foresters have fled to west Germany, and two men commonly share today what normally is a single position. Very few vacancies are apt to open up as long as the present situation lasts.

One outstanding characteristic of the German forestry schools is that the teacher usually holds or has held an administrative position in the local state forest service. For example, Dr. Reinhard Schober, who is Dean and Professor of Forest Management at Hann.-Münden, is also District Forester for the adjoining district of the Lower Saxony (Neidersachsen) State Forest which thus serves as the school forest. Again, Dr. E. Assmann is district forester at Wieda in the Harz Mountains, but he is also the Professor of Mensuration at Hann.-Münden, some 60 miles away.

France

Finally, mention may be made of the French National Forestry School at Nancy. This differs from all the others in that it is purely a state school. The number of students admitted is determined by the number of vacancies in the state forestry and affiliated services. The students are appointed to the service before entrance and go to school as governmental employees or officers. Otherwise, the school is similar to the others described. It has experimental areas in the nearby Forest of Haye, and a good school forest (d'Amance), about ten miles northeast at Nancy. Research at the latter spot, however, has been hampered by the fact that the front lines in the two World Wars passed through the middle of the forest. Even today, long after the bodies have been buried and the wrecked equipment scrapped, shell holes in the ground and shrapnel in trees are everywhere. A rusty frame of a German truck along the main woods road bears witness to the long interruption of silvicultural treatment and experimentation.

Forest Research

Generally speaking, there is perhaps less forest research activity in the west-central European countries than there is in the United States. Perhaps this is because their history of forest management is longer and their number of important species is smaller. Britain and Switzerland do have strong and active research organizations, but relatively little in the way of organized long-term research is being carried on in Germany or France, the countries with the most forest land.

Great Britain

Until recently, forest research in Britain was restricted to what could be done by the forestry staff and students at the various forest

[2] Zürcher Monats Chronik. Vol. 12, No. 4, 1943. Schweizerische Zeitschrift für Forstwessen (Swiss Journal of Forestry), October, 1947.

schools and a very few research officers in the Forestry Commission. Following World War II, however, an active research branch was established within the Forestry Commission, with the result that Britain has now the most active research program of any of the countries visited.[3]

The research branch of the Forestry Commission is largely concentrated at Alice Holt Lodge, an old manor house in a Forestry Commission forest, located near Wreeclesham, Farnham, Surrey. There is, however, a substation at Edinburgh for the north of England and Scotland where a small staff is stationed. The branch includes sections for silviculture (one for the north and one for the south of Britain), mensuration, entomology, pathology, ecology, and genetics. Principal emphasis at the moment is placed upon afforestation problems arising from the planting program of the Forestry Commission. Another major activity has been the recently completed census of woodlands. The Forestry Commission has also maintained a large number of permanent sample plot scattered throughout the island. Forest products research is independent of forest management research and is carried on by the Forest Products Research Laboratory which is located at Princes Risborough, Bucks. In addition to these two research agencies, the Forestry Commission subsidizes research in forestry at several colleges and universities. The investigations of Dr. Rayner on tree nutrition were carried on under these grants.

Switzerland

Switzerland, also, has a forest experiment station. It is affiliated with the Federal Institute of Technology at Zurich, but is independent from the forestry school there. Founded in 1885, it has long been a center of European forestry research, and has been staffed by such distinguished men as Buhler, Flury, Engler, Badoux, and Burger.[4]

Germany

In Germany, there is at present little organized research activity. The old research centers of Eberswalde and Tharandt are in the Russian Zone and apparently are in a state of suspended operation insofar as research is concerned. In the western zone, forestry is currently organized on a state basis. Although a few of the states have men assigned to research, in most cases research is left to the members of forestry school faculties and to district foresters to do in their spare time. Actually, the German love of research results in quite a bit being done. The technical journals are full of research articles, and a large number of research monographs are being published in book form. Nevertheless, the situation is such that little in the way of long term research can be initiated. For example, there is little activity as yet in the field of forest genetics where the minimum research program must cover a number of years.

France

In France, there is a Forest Research and Experiment Station which functions as a part of the National School of Waters and Forests at Nancy.[5] Although established as early as 1882 it was operated on a very limited basis until 1937 when seven branches were established at Nancy, most of which were placed under the direction of one of the professors at the forestry school. The actual research staff remains small. As in other countries visited, forest products research is carried on by entirely separate agencies.

[3]F. Y. Henderson and James Macdonald. 1950. Research in the United Kingdom. Unasylva (4)1:14-21.

Forestry Commission. 1950. Report on forest research for the year ending March, 1949. 80 pp.

[4]Burger, Hans. Geschichte, Tätigkeit und Ziele der Eidgenösschen Anstalt für das forstliche Versuchswesen (History, activities, and objectives of the Federal Institute for forest research). Schweiz. Zeitschrift für Forstwesen, 22 pp. 1948.

Several articles in Zürcher Monats Chronik 12(4), 1943.

[5]Rol, R. C. and M. Villière. Organization of research in France. Unasylva. 4(2):60-68. 1950.

The Lateral-Terminal Elongation Growth Ratio of Red Pine as an Index of Saratoga Spittlebug Injury[1]

Daniel M. Benjamin, Harold O. Batzer, and Herbert G. Ewan

Bureau of Entomology and Plant Quarantine[2]

THE DETERMINATION of suitable criteria for evaluating subclinical or subeconomic damage caused by forest insects is of paramount importance in the initiation of control activities. This is particularly true for the Saratoga spittlebug, *Aphrophora saratogensis* (Fitch), an insect commonly injurious to red and jack pine saplings in the Lake States.

When spittlebug populations are low, little or no twig mortality results from the adult feeding on the needle-bearing portions of sapling trees. It is only when populations are high that feeding causes twig killing (flagging) and tree mortality. As spittlebug populations increase, and before twig-mortality thresholds are reached, perceptible changes in tree form occur. Lateral branch elongation of noninjured red pines decreases progressively from the uppermost whorl toward the base of the tree. This uniform growth pattern is disrupted by severe spittlebug feeding. Investigations were begun in 1951 to determine the feasibility of measuring these changes.

The criterion of tree form selected for evaluation of the effects of subclinical spittlebug injury to red pine was the correlation between the ratios of lateral to terminal elongation. It was reasoned that, if uninjured, open-growing red pine demonstrated a growth pattern that was constant in all soil types from season to season and in all parts of the region, the severity of spittlebug injury would be reflected by the magnitude of the deviation or disturbance in the growth pattern.

Growth patterns were derived for uninjured red pine by plotting the decimal ratios of lateral to terminal elongation for each season's growth against the corre-

TABLE 1.—COEFFICIENTS OF CORRELATION AND REGRESSION FOR LATERAL-TERMINAL ELONGATION GROWTH PATTERNS OF OPEN-GROWING UNINJURED SAPLING RED PINE—MICHIGAN

Location	Year	Coefficients		Standard error
		Correlation (r)	Regression (b)	
T21N, R13W, S9	1950	−0.999	−0.072	0.007
	1949	−0.976	−0.085	0.035
	1948	−0.996	−0.084	0.012
T21N, R12W, S12	1950	−0.990	−0.093	0.018
	1949	−0.994	−0.107	0.021
	1948	−1.000	−0.096	———
T21N, R11W, S6	1950	−0.996	−0.102	0.009
	1949	−0.986	−0.100	0.031
	1948	−0.957	−0.074	0.035
T21N, R10W, S18	1950	−0.993	−0.090	0.023
	1949	−0.983	−0.110	0.039
	1948	−0.994	−0.097	0.017

TABLE 2.—COEFFICIENTS OF CORRELATION AND REGRESSION FOR LATERAL-TERMINAL ELONGATION GROWTH PATTERN OF RED PINE DAMAGED BY SARATOGA SPITTLEBUG AND SPRAYED WITH DDT—MICHIGAN

Location	Year	Coefficients		Standard error
		Correlation (r)	Regression (b)	
T42N, R18W, S9	1951	−0.978	−0.044	0.027
	1950	−0.981	−0.048	0.024
	1949	−0.794	−0.027	0.049
	1948[1]	−0.018	−0.0005	0.057
	1947	−0.548	−0.034	0.062
	1946	−0.951	−0.027	0.014
T42N, R18W, S16	1951	−0.980	−0.056	0.034
	1950	−0.987	−0.051	0.022
	1949[1]	−0.458	−0.012	0.056
	1948	−0.424	−0.011	0.048
	1947	−0.888	−0.088	0.084
	1946	−0.928	−0.102	0.065

[1]Year sprayed.

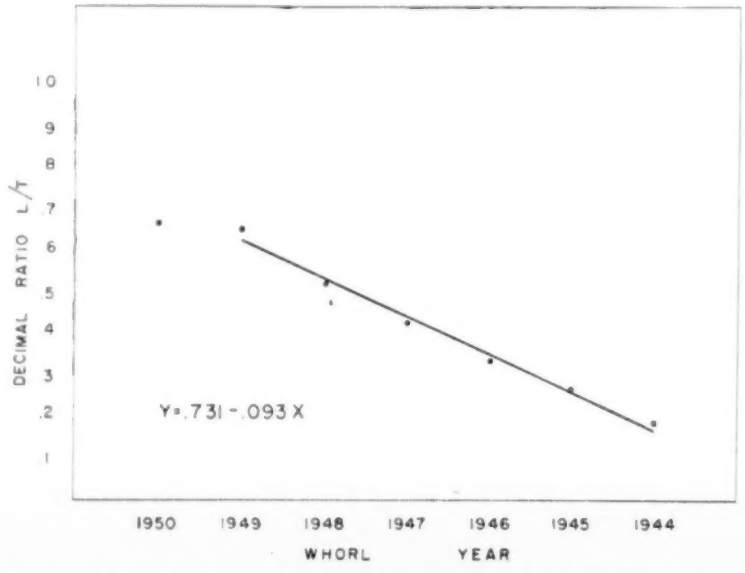


FIG. 1.—Lateral terminal elongation growth pattern for uninjured red pine.

[1]Presented at the meeting of the American Association of Economic Entomologists, Philadelphia, Dec. 15-18, 1952.

[2]Agricultural Research Administration, U. S. Dept. of Agriculture.

sponding whorl years. On samples of 10 trees each 3 branches in each whorl were measured. The first, or current, lateral-terminal growth ratio was disregarded, as it was consistently of the same or lesser magnitude than the second ratio. The correlation analysis indicated a highly significant negative linear relationship constant for 3 seasons' growth in north-central Michigan (Table 1).

A graph of a typical growth pattern for an uninjured open-growing red pine plantation is presented in Figure 1.

Growth patterns and coefficients computed for two open-growing uninjured sapling red pine plantations in northern Minnesota fell within the Michigan normalcy zones; r = −0.943 to −0.996, b = −0.063 to −0.098. Following discussions between the senior author and the late Dr. R. C. Friesner, of Butler University, concerning growth responses in terminals and laterals of red pine, Friesner and Jones[3] collected terminal and lateral elongation data in southern Indiana. Growth-pattern analyses indicated that these data also fell within the aforementioned zones of normalcy; r = −0.920 to − 0.996, b = −0.061 to − 0.138.

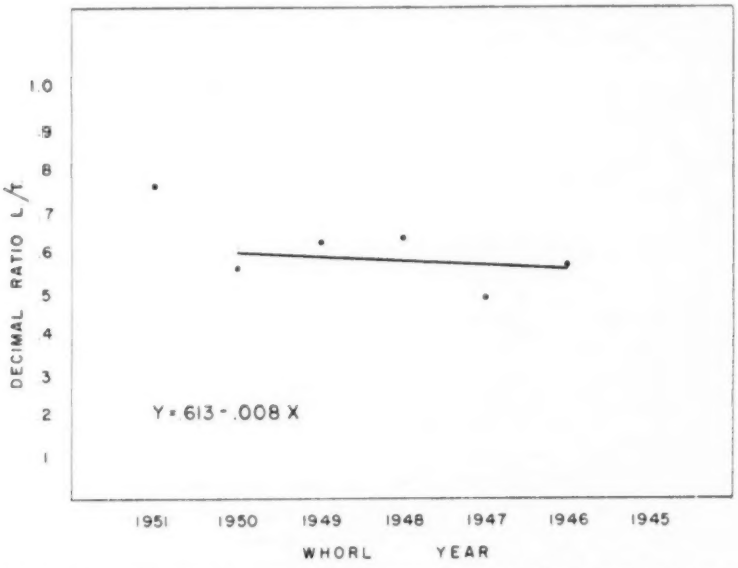


FIG. 2.—Lateral-terminal elongation growth pattern of spittlebug-injured red pine at threshold of twig mortality.

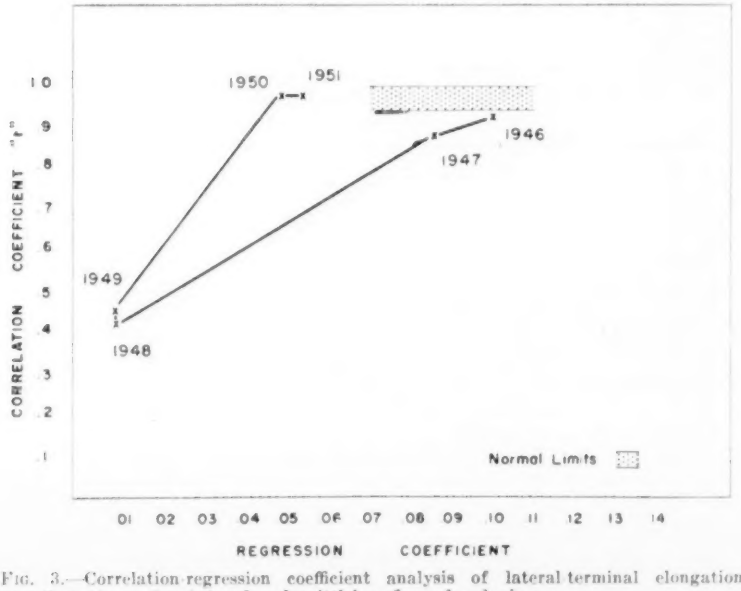


FIG. 3.—Correlation-regression coefficient analysis of lateral-terminal elongation growth pattern of uninjured and spittlebug-flagged red pine.

Analysis of data collected in north-central Michigan from paired non-flagged open-growing red pine and from trees having one flagged twig per tree revealed drastic departures in coefficients of correlation and regression from zones of normalcy:

Tree classification	Non flagged	One flag per tree
Coefficient of correlation	−0.210	−0.220
Coefficient of regression	−0.011	−0.008
Standard error	0.091	0.068

These trees may be considered at the threshold of twig mortality. The magnitude of the deviation from zones of normalcy is illustrated in Figure 2.

Examination of coefficients for years preceding spittlebug flagging injury revealed the progressive nature of this growth-form deterioration (Table 2). When trees were sprayed with DDT to control the adult population, this deterioration was abruptly halted and a return toward normalcy occurred the following season. These progressive changes in tree form are well illustrated in Figure 3.

These studies are of a preliminary nature. Using this method of tree-form analysis, investigations will be continued in 1953 to determine the rate of spittlebug population increases, to correlate spittlebug population densities with subeconomic and economic injury, and to determine thresholds of twig mortality for various parts of the Lake States.

[3]Friesner, R. C., and J. J. Jones. Correlation of elongation in primary and secondary branches of *Pinus resinosa*. Butler University Botanical Studies 10: 119-128. 1952.

Notes

Discussion of "Laminating and Steam Bending of Treated and Untreated Oak for Ship Timbers"[1,2]

Admiral W. M. Fechteler, the Chief of Naval Operations, United States Navy, has recently stated "a Navy can only accomplish its mission with adequate Naval forces, provided long before the need for their services arises. When you need the ships it is too late to begin to build them."

The shipyards in every state of the United States including Montana are busily engaged in building wooden ships and small wood craft for the United States Navy. Wooden hulls accompany the fleet in every mission of peace and of war, and in certain instances operate as a spearhead in advance of major landing operations.

White oak has been an important shipbuilding wood in America since the coming of the white man. The supply of this wood is not sufficiently abundant for the needs of the shipbuilder in these times. Roughly one tree in 200, or one tree per acre, will yield a high quality grade of bending oak for the shipwright. The quality of this stock must be nearly perfect for successful bending of ship frames up to 3 inches x 5 inches x 20 feet in size. The process described by Dr. McKean for bending laminated white oak has increased the supply of this material; for every white oak tree now yields some 1-inch lumber which is suitable for laminating, and which can be steam bent. The yield of suitable grades of this species for bending is approximately 10 percent of the logs. By extending this utility to the red oak species through wood preservation and laminating, the potential supply of bending oak for shipbuilding has been tremendously increased. About one half of the 7 billion board feet of the hardwood lumber produced in the USA in 1951 was red and white oak, with the greater portion of high quality lumber grades being of the red oak species.

The quality of the ship has been improved by this process, since red oak can be readily preservative treated, and a 30-year service life of treated wooden hulls appears feasible, in lieu of 7- to 10-year service life of many World War II hulls.

The research project described by Dr. McKean is a key to wider acceptance of a great variety of domestic wood species as a structural shipbuilding material. The Bureau of Ships is presently translating this research into production with marked success at three shipyards.

J. G. Kuenzel
Bureau of Ships,
U. S. Navy

[1]Comments delivered following the presentation of the indicated paper at the joint S.A.F.—C.I.F. meeting, Montreal, Canada, Nov., 1952.

[2]The paper, "Laminating and Steam-Bending of Treated and Untreated Oak for Ship Timbers," by Herbert B. McKean, R. R. Blumenstein, and W. F. Finnorn was published in the December 15, 1952, issue of the *Southern Lumberman* and is also available in booklet form from the Timber Engineering Co., 1319 18th St. NW, Washington 6, D. C.

Estimating Girdling Time

Girdling in upland hardwood stands has been carried on over a 5-year period to eliminate defective and undesirable trees on parts of the Kaskaskia Experimental Forest in southern Illinois. On these areas, all cull trees larger than 4.5 inches d.b.h. were girdled by cutting a V-notch with an axe through the bark and into the sapwood 1 to 2 inches. The species were chiefly hickory, upland oaks, and black gum. The topography on the experimental forest is hilly with slopes ranging generally from 15 to 50 percent. Girdling was done by crews trained on the experimental forest, although personnel changed from time to time.

The basal area of the girdled trees averaged 15.1 square feet per acre. The diameter of the average girdled tree was 8.7 inches. It took 2.3 man-hours to girdle all cull trees on the average acre—a rate of 6.5 square feet of basal area per man-hour.

Yocom[1] found that .005 times the sum of the diameters gave a good estimate of man-hours required for girdling some hardwood stands in Alabama and Arkansas. This formula, however, does not fit the data for upland hardwoods in southern Illinois. When man-hours and the sum of diameters of girdled trees for the present study were plotted (Fig. 1), a highly significant

[1]Herbert A. Yocom. Estimating the time needed for girdling hardwoods. Jour. Forestry 50:484. 1952.

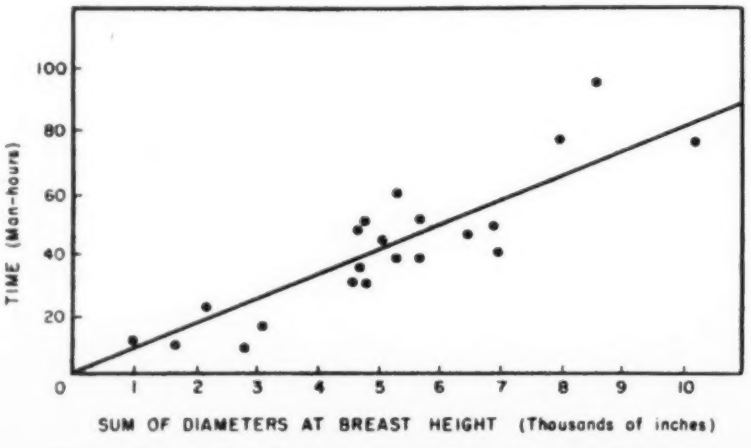


Fig. 1.—How girdling time increases with the sum of the diameters.

straight line regression resulted. The formula is:

Man-hours = .00816 times sum of diameters in inches.

Under conditions similar to those at the Kaskaskia Experimental Forest, therefore, girdling time in man-hours may be estimated by multiplying the sum of the diameters in inches by .008. Roughly similar results will be obtained by multiplying the total basal area of girdled trees by .155.

LEON S. MINCKLER
and BENJAMIN A. ROACH,
Carbondale Research Center
(maintained in coop. with Southern Illinois Univ.),
Central States Forest Experiment Station, U. S. Forest Service.

Determining Burned Area by Aerial Mapping

Following the devasting forest fires of October and November, 1952, the Tennessee Valley Authority was interested in finding out how much area had burned in the Tennessee River watershed. For most of the valley, information was readily available from state and federal forestry agencies. But for the 36 mountain counties of East Tennessee it was not so easy. The burn here was exceptionally heavy. Ten of the counties were not participating in organized state protection, hence there were no records even of number of fires. So, for this area we developed an aerial survey plan which proved to be reliable yet inexpensive. It was developed by the author in collaboration with Birger W. Ellertsen, T.V.A. Division of Forestry Relations. The method may be useful elsewhere.

Extensive forest areas predominate in the Cumberland Plateau and Smoky Mountain foothill counties, while the intervening Great Valley of East Tennessee is characterized by scattered woodlands. Hardwoods are most abundant, although in much of the area they are mixed with coniferous species. Detailed topographic maps showing forest cover are available for most of the area. Elsewhere, we were forced to use highway maps which showed most of the topographic features.

Sample strips, one-quarter mile wide and five miles apart, were plotted on the maps in an east-west direction. Some 22 strips, totaling almost 2,700 miles in length, were required to cover the area. This sample area represented nearly 10 percent of the total land area and 9.6 percent of the forest land area in the 36 counties. To facilitate handling in the plane, the topographic maps were cut down to a 12-inch width with the sample strip in the middle of the map. Since the map scale was 1 inch to 2,000 feet, this left about 2¼ miles of topography on each side of the sample strip to help the pilot maintain his correct flight line. The highway maps, scale 1 inch to 1 mile, were small enough to permit easy handling without cutting.

The pilot flew the plane so that the entire sample strip was always on the same side of the plane as the observer, who plotted burned area on the maps. Some 48 hours of flying time, from the middle of November to early December, were required to cover all sample strips. The amount of burned and unburned forest land on the sample strips was then determined by grid count. Approximately 20 percent of the forest land in the sample had burned. This percentage was then applied to total forest to determine total area burned in the 1952 fall fire season.

Naturally we learned a good deal about techniques in the course of the survey. We found that 500 feet was about the best elevation. If we went higher, the burned areas were harder to pick out. Flying under 500 feet was crowding the safety factor too much. With the map scales we were using, an average speed of about 60 miles an hour enabled us to plot fire locations with a high degree of accuracy. At faster speeds, we had to do a lot of back tracking for accurate plotting.[1]

We laid out the sample strips in an east-west direction so that flight lines would cross ridges and other natural features, which run generally north and south. We felt this would make it easier for the observer to pinpoint ground locations. This was borne out in actual experience for we sometimes had difficulty orienting ourselves when flying north or south from one flight line to the next.

We also found it was easier to spot burned areas by flying west in the morning and east in the afternoon. After 4:00 p.m. it was almost impossible to identify burned areas because of decreased light and the shadows cast by late afternoon clouds. Since it was not always possible to fly with the sun at our backs, we found sun glasses most helpful.

While it was easy to separate spring fires from fall fires, it was impossible to tell whether the fall fires had burned during the critical period in late October and early November or whether they had occurred earlier. Leaf-fall after a fire sometimes covered a burn, making it necessary to take a second look at the area. We soon learned, however, that the dead foliage still remaining on the oaks could be used as an indicator. Normally it has a bronzed smoky appearance. On burned areas it is bleached or faded, somewhat lighter in color.

Weather conditions prevented our flying every day, but as long as we had a 2,000 foot ceiling, we were able to continue. Occasionally, when the ceiling was low, we had to stay in the Great Valley and leave the mountainous areas for better weather.

Since it is 35 miles from the T.V.A. office to the airport, there were often wide variations in

[1]No ground checks to establish accuracy were run as it was felt that the accurate topographic maps of the area precluded the necessity. At slow air speeds it was possible to pinpoint location on the map at all times.

weather between the two points. We arranged for the pilot to call the Weather Bureau each morning to determine flying conditions and then let us know if we could fly that day. This arrangement, while resulting in some loss of flying time on good days, saved many needless trips to the airport.

The pilot had no difficulty in adjusting to this type of survey. In fact, he became extremely interested, frequently assisting the observer in spotting and pinpointing fire locations.

The survey was relatively inexpensive, yet it did provide a statistically reliable estimate of area burned. A private flying service furnished a fixed wing, single engine plane (Cessna 170) and a pilot at a cost of $18 per flying hour. For the 48 hours this amounted to $864. Travel to and from the airport cost $31, maps $50 and T.V.A. personnel time $355. This brought the total cost to $1,300.

A rough statistical check for accuracy indicates a standard error within 25 percent for individual counties and within 10 percent for the entire area.

A. M. WILLIAMS, JR.,
Tennessee Valley Authority,
Norris.

Veneer Tables: Surface Feet Tabulations for Rotary Cut And Special Veneers

These tables are the outgrowth of expressed need for correlation of surface feet of veneers of varying thickness with cubic feet log content that may be anticipated from equivalent trees and logs of given dimensions. Something closer than a rule of thumb seemed necessary. Admitting that these tables are theoretic in formulation, it is believed that they will give a fair indication of the square footage for the respective subject logs until their correctness can be checked in the laboratory or manufacturing establishment.

The actual yield of veneers will be considerably less than shown because the vast majority of veneer bolts and logs carry irregularities such as numerous defects and wide deviations from the perfect right cylinder on which the calculations are based.

Table 1 applies to rotary cut veneer and shows the surface feet of 1/10 inch thickness to be anticipated from 4 foot bolts with diameters inside the bark at the small end as shown in the first column, assuming of course that the subject bolt is the perfect right cylinder, free of all defects and is one of the ideal veneer species. The second column shows the anticipated square footage in 1/10 inch thickness. The square footage for other thicknesses can be calculated proportionately, as for example the square footage of 1/28 inch thickness, a common cut, can be obtained by multiplying the figure opposite the d.i.b. for 1/10 inch by 2.79, and the square footage for ⅛ inch thickness can be obtained by multiplying the corresponding footage for 1/10 inch by 0.80 and so on. To obtain the anticipated footage from a bolt measuring 20 inches in diameter at the small end, multiply the figure for 1/10 inch thickness for a 20-inch bolt by 2.79 which would be 2,182 square feet, not considering the possible added waste in cutting 1/28 inch as against 1/10 inch.

Table 2 is the calculated net square footage of sliced veneer to be anticipated from standing trees of dimensions shown. In this table the net usable volume of wood represented is the aggregate of five 2-foot segments with additional calculated volume in the root burl and shows the footage of 1/20 inch thickness. The same variables for correctness will be met with in applying this table as in using Table 1 and will need adjustment in the judgment of an experienced scaler or cruiser who is using the table. These segment contents are calculated from d.b.h. outside bark with a prorated taper to the top of the first 10-foot log starting at the ground level. In the case of sliced veneer as established by this table, the perfect right cylinder was used and the deviations of the bole of the subject tree from the right cylinder should not be as important a factor in deductions for defects as in the case of rotary cut veneer. Irregularities in this table need

TABLE 1.—VENEER BOLTS: THEORETICAL FOOTAGE IN FOUR FOOT LENGTHS

Diameter i. b. inches	Square feet of veneer in 1/10 inch thickness
10	102
11	147
12	200
13	251
14	312
15	380
16	448
17	524
18	605
19	691
20	782
21	880
22	982
23	1089
24	1202
25	1319
26	1442
27	1571
28	1704
29	1843
30	1986
31	2136
32	2291
33	2450
34	2615
35	2786
36	2961
37	3141
38	3327
39	3519
40	3715

TABLE 2.—SLICED VENEER FROM STANDING TREES: THEORETICAL SQUARE FOOTAGE TO BE ANTICIPATED FROM TREES OF DIFFERENT DIAMETERS TO 10 FEET ABOVE GROUND LEVEL

D.b.h. inches o.b.	Square feet of sliced veneer in 1/20 inch thickness
10	668
12	1078
14	1447
16	1891
18	2461
20	3094
22	3756
24	4546
26	5390
28	6297
30	7336
32	8455
34	9629
36	10941
38	12316
40	13765
42	15006
44	17039
46	18839
48	20722

ironing out to fit the various contourages of forms that may be encountered in slicing crotches, burls, root-wads and oval shaped boles for fancy and figured-face veneers. Two inches of sap and one inch of bark was deducted from the 24 inch d.b.h. tree and was worked out with varying thickness each way therefrom, thicker for larger trees and thinner for smaller trees on the bark correction and larger for smaller trees and smaller for larger trees for the sap correction. The square footage of the thicknesses can be derived proportionately with this table the same as with Table 1. Table 2 uses the 1/20 inch thickness as the base. To get the footage of 1/100 inch thickness, multiply these figures by 5.00 or to get the footage of 1/28 inch thickness multiply the 1/20 inch figures by 1.40 and so on.

T. W. MCKINLEY
Falls Church, Va.

Release and Fertilization Stimulate Longleaf Pine Cone Crop

To test the effects of release and fertilization on the cone production of second-growth longleaf pine, the Southern Forest Experiment Station in 1948 initiated a study involving the following four treatments: release, fertilization, release and fertilization, check.

In release treatments, all dominant, codominant, and intermediate trees were removed from a radius of 17 to 20 feet around the sample trees. The fertilized trees received an application of 5-15-5 fertilizer in February 1949 and again in February 1951. Eight-inch trees received 19 pounds of fertilizer per application, 10-inch trees 30 pounds, and 12-inch trees 44 pounds. The competing trees in the fertilizer treatment were also fertilized, the amount varying with their diameter and proximity to the sample tree.

There were 144 sample trees, one third of them at each of three experimental forests—the Escambia in south Alabama and the McNeill and the Harrison in south Mississippi. The trees were divided equally among the three diameter classes mentioned above.

Results

In each of the first two years following treatment, the sample trees produced an average of less than one cone apiece. There was no apparent response to release or fertilization or both.

In the third and fourth years after the initial treatment, however, differences appeared. In 1951 the treated trees averaged 12 times as many cones as the untreated checks (1.8 cones per check tree), and in 1952 the treated trees averaged four times as many cones as the untreated checks (0.9 cone per check tree). The average annual cone production in these two years was 1.3 cones per check tree, 6.9 per released tree, 13.5 per fertilized tree, and 16.7 for trees both released and fertilized.

Response to release cannot be compared to response to fertilizer, since only a single level of each was tested and that particular level may not have been optimum. Release plus fertilizer produced more cones than release alone. However, release was not so complete in this test as it is in a seed tree cutting, and possibly more completely released trees would have responded so much more to release that they would have benefited little from the addition of fertilizer.

Cone production of the sample trees in 1951 and 1952 was consistent with earlier behavior. Those trees (50 percent of the total) that had been coneless in the good seed year of 1948 averaged only 4.5 cones apiece in 1951 and 1952, while trees with cones in 1948 averaged 14.7. These figures include all study trees regardless of treatment. There was no significant interaction between treatment and past cone production.

Size of tree was also related to cone production. In 1951 and 1952 the average annual count for all study trees was 4.6 cones per 8-inch tree, 10.3 cones per 10-inch tree, and 13.9 per 12-inch tree (sizes refer to d.b.h. in 1948).

The foregoing observations on release and fertilization are consistent with results on longleaf reported by Gemmer,[1] Maki,[2] and Croker,[3] and with findings of the Southeastern Forest Experiment Station on loblolly pine.[4]

ROBERT M. ALLEN,
Southern Forest Experiment Station.

[1]Gemmer, E. W. Well-fed pines produce more cones. U. S. Forest Serv. Forest Worker 8 (5): 15. 1932.

[2]Maki, T. E. Local longleaf seed years. Jour. Forestry 50: 321-322. 1952.

[3]Croker, T. C. Early release stimulates cone production. South. Forest Expt. Sta. South. Forestry Notes, May 1952.

[4]U. S. Forest Service. Southeastern Forest Expt. Sta. Quart. Rpt., October-December 1951.

Points of View

Comments on Growth Study Procedures in Small Woodlots

In an article by L. O. Grapp in the Journal in April entitled "Procedures for Analyzing Small Woodlots,"[1] I note that the method of determining average growth in diameter is to count the rings in the last decade and average them.

This method is statistically false, since it assumes to determine diameter growth based on time (decades) while actually it is determining time (years) based on diameter (1 inch). Unless there is perfect correlation, the divergence between these two bases is actually a measure of the degree of correlation between age and diameter growth. Instead, it is assumed as an accurate measure of the average growth in diameter.

On page 436, *Forest Mensuration*, by Chapman and Meyer, the nature of this error is set forth and its effect, which is always to lower the rate of growth found by this false method from the actual average growth per decade. The example given shows that in the case of two trees, one growing 5 rings in the last ½ inches the other 15 rings, the false method gives a growth of 1 inch per decade and the corrected procedure 1.33 inches, or 33 percent more. The error is due to the fact that the more rings there are in an inch, the greater will be the weight of the growth in the average. When the decade and not the inch is used as the basis, growth per decade is correctly shown, as in the above case, and will always exceed the false average.

I have been trying to combat this false method for about 30 years, but it keeps cropping up in official procedures. What excuse is there for foresters to use inaccurate methods of growth prediction, any more than for engineers to employ erroneous formulae for calculating strength of bridges?

H. H. Chapman

Generally there are from four to twelve growth borings taken on the small woodlands. These borings are taken on the good growing stock trees only. In the great majority of cases the number of rings per inch recorded fall within a rather narrow range of variation on any one woodland. Checking of actual cases in the field indicates that the evening off of the ring count by dropping the fractional part of a ring will bring both methods of measurement in close agreement.

The analysis method we use is designed to give quick results which are sufficiently accurate for small woodland management recommendations. Also, all our work in the woods is done in company with the owner, to whom each job we do is explained. It is possible for the average timber owner to understand growth of trees from ring counts, but he can get very confused and so can the forester when you try to explain the number of inches and hundredths of an inch a tree grew in 10 years.

It is of course optional with the forester as to how he obtains his average number of growth rings per inch of radius to apply to the growth formula. He can make a straight mathematical average of his ring counts or he can measure the inches of growth in the last 10 years and convert these measurements to the average number of rings per inch to apply to the formula.

We appreciate Mr. Chapman's comments.

Merle S. Lowden,
Asst. Regional Forester,
Milwaukee, Wis.

[1] Grapp, L. O., Procedures for analyzing small woodlots. Jour. Forestry 51: 269-274.

Increasing Water Yield

Of interest to cities facing water shortages, are the findings of twelve years of research by the Forest Service indicating that periodic harvesting and thinning of young trees can produce a permanent increase of 25 per cent in water yield from a watershed. The experiment carried on at Ft. Collins, Colo., revealed that as much as 30 per cent more water could be produced from an area when the mature trees were cut in dense virgin stands of lodgepole pine and Englemann spruce. These thinnings open up spaces into which winter snows can pack in greater depth, and hence increase the useful summer runoff of water.

Reviews

Soils and Land of Michigan

By J. O. Veatch. 240 pp. Illus. Michigan College Press, East Lansing, Michigan. 1953. $7.50.

This book summarizes 30 years of soil research experience in Michigan. The author, working many years ago with Austin Cary in Florida and G. L. Pearson in Arizona, learned early in his career that minor differences in the soil characteristics can often be detected by differences measured in tree growth and species associations. With this appreciation of ecology, plus his fundamental training in geology and soils, the author has been able to accumulate a vast knowledge of the soils, land types, and original forest types of Michigan and their socio-economic effects during the past 30 years.

The book might be grouped into three sections for review purposes. The first seven chapters discuss the physical features of Michigan, major classes of soil parent material, types of tree vegetation, soils and soil associations or land types. This portion of the book is quite technical. Following this scholarly presentation is a series of over 100 photographs illustrating pictorially the soil and land features described in the preceding seven chapters. From the pictorial section the casual reader can obtain a rather complete informative picture of the soils and land of Michigan.

It is in the last section of the book, starting with Chapter 8, that the author reveals his socio-philosophical ability, which stems from a wealth of technical knowledge in all the natural sciences, plus years of experience in many fields, all blended together—mellowed by age and wisdom. The author interprets the environmental meaning of natural soil and land features and their geopolitical relation to people and the economy of the state. The elements of social organization, stress of population and competition among individuals, kinds of industry, mental attitudes both developed and inherited, and governmental policy—each in itself becomes a factor for consideration in determining land use. In other words, the capacity of the land is determined not alone by biotic potential and resistance of natural elements, but by man-made environments as well.

During the past 100 to 125 years the landscape of Michigan has been changed by human activity. In discussing land use, the author states that while man can not change the major physical elements of his environment, such as climate and topography, he can change the vegetation, the fauna, the soil, and the waters. Some of these changes may be regarded as good or bad in terms of human welfare. These changes can not be evaluated or expressed mathematically, and therefore it becomes a matter of opinion, more often emotional than rational. For what has been done to the natural landscape of Michigan, the living occupants and their forbears are to be neither unreservedly extolled nor exonerated, venerated nor vilified. Fixing culpability is pointless. One must accept the fatalistic philosophy that men do whatever they have to do under circumstances which are never entirely of their own making, and the end result is ineluctable.

The discussion of rural land use in Michigan (Chapter 10) contains real meat for both political and economical digestion.

A land policy for Michigan, according to the author, should have for its ideal objective the attainment and maintenance of a proper balance between agricultural and non-agricultural uses of land; between public and private ownership; between exploitation for profit by the individual and, on the other hand, conservation for the welfare of the state as a social unit. Proper balance of these uses is not discussed because the author feels that this will always be a matter of opinion. Also explored and discussed are policies in relation to agricultural use of the land, drainage, urbanization, state ownership, soil conservation districts and rural zoning, state and national policies.

The author concludes that the ultimate limiting resource for the maintenance for an increasingly complex social organization is not so much the soil, forests, and minerals, as we have known them, but water.

This book, prepared during the first two years of the author's so-called "retirement," is designated as No. 7 in the Memoir Series of the Michigan Agricultural Experiment Station.

The associates of J. O. Veatch know that he still has reams of unfiled, faded field notes which need to be compiled and interpreted in publication form to further perpetuate the vast knowledge that he has acquired, especially in regard to the effects of the land on the original vegetation of Michigan.

JOHN L. AREND.

Freedom and Plenty: Ours to Save

By Wilfrid S. Bronson. 124 pp. Illus. Harcourt, Brace and Co., New York, N. Y. 1953. $2.95.

There have been many fine children's stories about our nation and its battles and heroes; but our country and its battle resources have not been too well dramatized. Author Bronson has eminently succeeded in doing this in a book vivid in both text and illustrations. It is aimed at the child of grade school level, but has value for teachers and as a text and reference.

The subject material covers the entire field of conservation including both renewable and nonrenewable resources—soil, water, forests, game, fish, oil, coal, and metals. Starting with a history of our country he traces the exploitation of our natural treasures for a span of three centuries.

Bronson puts across the idea of conservation by contrasting a not

too imaginary "Valley of the River Muddyflow" as a horrible example of resource misuse, and "The Cleargood River Valley" as a model of good conservation. In the latter all the techniques of good land use, resource management, and planning come into play. This includes proper dam construction; wisely managed forests; good farm practices such as contour planting, strip cropping and animal husbandry; abatement of pollution, both industrial and municipal; and better over-all city planning.

The author points out the good features of the present conservation program such as controlled cutting on national forests, national parks to preserve scenic areas, laws controlling the taking of fish and game, and a good start on state, county, and town forests. School forests come in for a favorable plug. The author cites the good work of soil conservation districts and the great demonstration value of the big field days in which a rundown farm is completely and spectacularly revamped in a single day. Stressed are the gradually improving utilization of wood and of byproducts from the coal and steel industry. Bronson points out that there is, however, still vast room for improvement in our efforts to become a less wasteful nation. There is still too much poor

Of special interest in this book, not only to students but also to teachers, is the chapter with practical suggestions to the individual on how he can personally further the conservation program. This runs the gamut from saving scrap paper and metals, to fixing leaky faucets, being careful with fire in the woods, and joining organized groups such as 4-H clubs to learn about and practice conservation at first hand.

It is a continual source of delight to the reader that so many facets of this big problem are brought forth. The black and white drawings elaborate the ideas of the text. From pictures of birds, fish, and animals to diagrams of the activities of a field conservation day the drawings are generally accurate.

However, there are a few spots where there might be room for improvement, such as the detailed drawing of school tree planting activities. At least here in Wisconsin, our school children are taught to protect the roots of their seedlings in moss while they are planting them on the school forests; and are not likely to be using a garden trowel to plant fairly large evergreens!

In the text it is stated that lumbering is prohibited in wildlife refuge areas in national forests. This is seldom, if ever, true because systematic logging actually improves these areas for certain types of game, notably deer. The failure to cite industrial forests as a favorable factor in the balance sheet for conservation is an oversight in the book. In the overall picture Bronson has done an accurate and comprehensive job of illustrating and writing about the enormously large field of conservation and has produced an attractive and readable book.

HAZEL STOICK STOECKELER

A Standard Hardwood Quality Index: Proceedings of a Symposium

85 pp. Illus. Purdue Agricultural Experiment Station, Lafayette, Ind. 1953

Manful efforts are made from time to time by the specialists in wood quality to standardize their grading schemes and kindred procedures, and to win general acceptance of uniform methods. As foresters and wood users have grown to recognize that good measures of quality are essential, such efforts have come to be blessed with rising success. Occasionally, though, the experts return home from what has seemed a harmonious conference on standardization, only to go their several ways again.

Whatever the success of the present symposium in establishing rules of the game, it is likely to prove well worth while in explaining and publicizing a handy, versatile, but as yet little-used tool of forest, market, and mill management: the "quality index." This tool was fashioned and first used in *Grade Yields and Overrun from Indiana Hardwood Sawlogs* (1946) by Prof. Allyn M. Herrick of Purdue, a leader in the symposium.

A quality index, speaking in terms of sawed products, is simply the weighted average price per M of all the lumber of various grades that a log or tree will yield. The peculiar usefulness of the index arises from two facts. The first is that the index is expressed, not in dollars, but in percentage of the price of a particular "reference" grade and size of lumber. The second fact is that grade lumber prices stated thus percentagewise change amazingly little, even in periods when dollar prices are behaving wildly. Thus the quality index is a "pure" number that may be computed for any individual or class of log or tree, from grade prices in some base period, and which will for some time thereafter continue to be a valid measure of quality, and may always be converted to dollars and cents through multiplying by the current dollar price of the reference grade and size of lumber.

Such a quality index is a helpful device, not only for the immediate purpose of shortcutting cumbersome grade-yield percentage as an expression of log quality, but also in many practical jobs—for example, making log- or tree-grading rules, appraising stumpage, determining the financial maturity of trees, buying and selling timber, and judging sawmill efficiency.

Both the mechanics and some of the applications of the quality index are explained in a series of papers that opened the symposium. The conferees, who included many of the easterners active in research in the field, then turned to the question of standards. They proposed that in constructing hardwood indices, price data be taken ("until further notice") from the years 1947-1951 as a base period, and that the reference lumber thickness and grade be four-quarter No. 1 Common. The proceedings are good reading for the student of saw-timber quality, either hardwood or softwood. They will be

found stimulating, also, by those concerned with timber quality in terms of other products than lumber, for quality-index idea may well prove widely applicable.

WILLIAM A. DUERR

Fossil Plants of the Florissant Beds, Colorado.

By Harry D. MacGinitie. 198 pp. Illus. Pub. No. 599. Carnegie Institution of Washington, Washington, D. C. 1953. $5.25, paper bound; $5.75, cloth.

The village of Florissant, Colorado, 8,200 feet above the sea, lives in the valley of Twin Creek just east of South Park and 15 miles northwest of Pikes Peak. Road cuts, ridges, and ravines in and around the valley display reddish, granular outcrops of the basement rock—Pikes Peak granite—overlain by uneroded remnants of younger strata consisting of conglomerates, lava flows, and interbedded lacustrine shales. The latter, on being split, yield well preserved leaves, fruits, seeds, insects, and sometimes, fragmentary fishes and rare mammalian remains. Soon after the discovery of these fossiliferous shales in the early 1870's the area, both because of its delightful setting and the excellence of the fossils, became well known in paleontological circles, and in consequence, nearly every large museum in the world acquired specimens of the fauna and flora.

Inasmuch as the fossil-bearing outcrops at Florissant are isolated and have no direct collateral connections with other strata of known age, geologists have long speculated about their correct position in the geological column. From a practical point of view, therefore, Dr. MacGinitie's publication is opportune and important. After reviewing the geology of the region and the history of the investigations of the flora and fauna, he describes the floral species and marshalls all the evidence, which, in his opinion, spells the conclusion that the shales and fossils accumulated in the earlier half of Oligocene time, approximately 25 million years ago.

The living woody flora of the Florissant area consists chiefly of ponderosa pine, with some limber pine, Douglas-fir, Engelmann spruce, Colorado blue spruce, juniper, patches of aspen, alder, birch, and willow, wild rose, shrubby cinquefoil, currant, blackberry, serviceberry, chokecherry, mountain mahogany, and skunkbush-sumac. Grass and other herbs clothe the open spots.

The fossil flora, of about 150 species, has some of the aspects of the living flora, but the contrast between the two is marked. Among the pines, spruces, and firs, there are sequoia, torreya, and white cedar. The dicotyledonous species include poplar, willow, hickory, blue beech, chestnut, oaks, hackberry, elm, zelkova, mulberry, Oregon grape, laurels, hydrangea, currant, serviceberry, mountain mahogany, hawthorn, cherry, rose, locust, redbud, plane-tree, ptelea, ailanthus, cedrela, smokebush, sumac, celastrus, bladdernut, maples, dipteronia, koelreuteria, grape, Virginia creeper, linden, elderberry, and many others. The reader will note that this list contains numerous species foreign to the area today, whose living analogues are now found in eastern North America, eastern Asia, the southwestern states, Mexico, and South America.

MacGinitie concludes from the texture and relatively small size of the fossil leaves, and from the ecological implications of the insect fauna, that the flora lived in a warm temperate environment having less than 25 inches of rain, and at an elevation of less than 3000 feet above sea level. Along the streams and lake borders the vegetation was fairly lush, but on the higher ground beyond was an open scrub forest.

Perusal of this well-written and well-illustrated book uncovers several refreshing tendencies in paleobotany. For example, the author figured but refrained from naming many specimens he could not identify. He also used selective judgment in discarding as name-bearers many poorly preserved fragments, which, to the confusion and dismay of subsequent students, had been designated as types by former investigators.

This publication is the best summary of the Florissant situation to date but it is probably not the last word. New specimens will undoubtedly be found and will cause some re-identifications and perhaps some modification of the ecological interpretation.

ROLAND W. BROWN

Publications of Interest

• • •

Trees of Wisconsin, Their Ecological and Silvicultural Silhouettes, by S. A. Wilde, is an illustrated, non-technical description of the trees of that state, published by the Soils Department of the University of Wisconsin in cooperation with the Wisconsin Conservation Department. The use of silhouettes in helping to identify trees is an unusual feature of the booklet; and the author has inserted many literary references in the text.

• • •

The National Wildlife Federation has issued a *Directory of Organizations and Officials* concerned with the protection of wildlife and other natural resources. It may be obtained by writing the Federation at 232 Carroll Street, N. W., Washington 12, D. C.

• • •

Michigan College of Mining and Technology, Houghton, has issued a review of the work of their Forest Products Research Division in the Bulletin, *Forest Products Research*. This is a report on the accomplishments of the first six years of a state sponsored program to point out the opportunities for improved wood utilization that are available.

• • •

Foresters concerned with management practices in the Central Hardwoods region, about which there is a dearth of written information, may find help in *Guide For Improved Forest Management for Sawtimber from the Major Hardwoods in the Tennessee Valley*, published by the T.V.A., Norris, Tenn., and written by W. H. Cummings and T. G. Zarger.

• • •

A Timberman's Forest Operations Account Book has just been published in Minneapolis to provide a uniform

system of records for the small forest owner and farmer-logger. It was prepared by Charles H. Stoddard as a result of his experience in the management of his own timber farm at Minong, Wisconsin. Comparable in many ways to the farm account books which have long been available to farmers, it is available in quantity to paper mills, and other forest industries who wish to improve and strengthen relationships with their raw material suppliers. Inquiries should be directed to 441 Ridgewood Ave., Minneapolis 3, Minnesota.

* * *

The Chamber of Commerce of the United States has issued its *Policy Declarations on Natural Resources—1953*. Compiled by the Natural Resources Committee of the Chamber of Commerce, this booklet may be obtained from them at 1615 H Street, N.W., Washington 6, D. C.

* * *

A report by R. R. Reynolds, *Fifteen Years of Management on the Crossett Farm Forestry Forties*, has just been published as Occasional Paper 130 of the Southern Forest Experiment Station.

The paper gives a detailed account of two demonstration farm forests that have been managed since 1937 on the Crossett Experimental Forest in southern Arkansas. One of the forty-acre areas originally had a depleted stand of pine and an abundance of low-quality hardwoods. On this forty, it was hoped that light annual harvests would pay the costs of holding the land until the forest had restocked. The second tract was well stocked to start with. It was intended as an example of the returns possible after run-down forests are built up.

Reynolds describes the two forties when forest management began, the system under which they are harvested, the control of the low-quality hardwoods, the amount and value of timber cut, and the labor and other costs of harvesting and management.

On the well-stocked good forty, fourteen annual harvests yielded 175,000 board feet (Doyle scale) of sawlogs, 312 cords of pulpwood, 418 fence posts, and much firewood and chemical wood. The gross value of these products averaged $6.15 per acre per year on the stump.

Though the annual cuts were nearly equal to the annual growth, this forty now has a pine stand of about 8,300 board feet per acre, 3,000 feet more than when cutting began. The trees are of higher quality than in 1937, and also of larger average size.

While the good forty produced well, the depleted poor forty outran all expectations. On this forty the cuts were limited to half of the annual growth; nevertheless the thirteen harvests yielded 57,000 board feet of sawlogs and 153 cords of pulpwood. The returns from stumpage equaled $3.80 per acre per year. The pine stand now averages 4,600 board feet per acre, double what it was in 1937.

On both forties, a farmer could have doubled or tripled the yearly income from his woodlands by harvesting the trees himself and delivering them to the sawmill or pulpmill.

Copies of the report are available from the Southern Forest Experiment Station, 704 Lowich Building, New Orleans 13.

Coming Events

Northern California Section Meeting

The Northern California Section will hold its annual meeting on December 5, using the new convention facilities at the Mercantile Mart in San Francisco.

Kentucky-Tennessee Section Winter Meeting

The winter meeting of the Kentucky-Tennessee Section will be held in Gatlinburg, Tenn., Nov. 13 and 14. Paul Lane is chairman of the arrangements committee.

Mid-Century Conference Resources for the Future

Resources for the Future, Inc., will hold its "Mid-Century Conference" in Washington, D. C., December 2-4.

Western Forestry and Conservation Association

The Western Forestry and Conservation Association will hold its 44th forestry conference and annual meeting, Seattle, Washington, December 8-12.

Wisconsin Silver Anniversary Forestry Conference

The Wisconsin State Chamber of Commerce, Wisconsin Conservation Commission, U. S. Forest Service, and Forest Products Laboratory will sponsor a conference Nov. 30 and Dec. 1 in Milwaukee, to plan the state's forestry program for the coming 25 years.

If You Have Loved These

If you have loved the glimpse of a doe and fawn in the bracken at morning, when the mists rise out of the little valley; the resonant call of the grouse in the sentinel firs; and the sad sweetness of wild pigeons, calling one to another; and the wood duck low to the water; and the red rabbit that comes to the sand bar at dawn, out of the blackberry tangle—if you have loved all these, and love them still, be careful of fire in the forest.

If you have loved the deep, cool shadows of noon, with a hawk circling; the charmed sweetness of the drowsy woodland, smelling of fern and resin and berry; and a peace that flows outward and inward, like a great pulse in harmony; and the knowledge that here is no urgency, nor ever has been; and a pendant vine drooping with purple berries—if you have one time loved these, and had healing from them, be careful of fire in the forest.

If you have loved the lengthening shadows that come from the forest at evening, when the deer steal forth again, and the plumed quail; the awareness that at twilight the near hills draw nearer; if you have loved, in that listening stillness, the splash of a fine trout rising, or a sea-run salmon ascending the river; the assurance, somehow, that you are not alien to the trees, to the evening, nor to the creator of these; if you have loved all this, and these, and are grateful, be careful of fire in the forest.

BEN HUR LAMPMAN,
From the Portland *Oregonian*.

Current Literature

Compiled by MARTHA MEELIG, *Librarian, State University of New York College of Forestry*

Range Management Section Compiled by FRANCES FLICK, *Library, U. S. Department of Agriculture*

General

Development & Use Plan, University of Tennessee Forest Lands, Morgan & Scott Counties. Illus. Tennessee Valley Authority, Norris. 1953.

Is Forestry My Future? Produced by the Committee on the Regional Program in Forestry Education and Research, Composed of Representatives of the Accredited Schools of Forestry in the South and the Southern Regional Education Board. 13 pp. Illus. Printed by Stein Printing Co., Atlanta, Ga. 1953.

A Reconnaissance Study of Organization and Administration of the Forestry Department of the Venezuelan Ministry of Agriculture. By E. W. Loveridge. 49 pp. Illus. Consejo de Bienestar Rural, Caracas. 1952. Special Studies.

The Upland Hardwood Problem in Southern Woodlands; Technical Papers Presented at Second Annual Symposium School of Forestry, Louisiana State University, April 14-15, 1953. Mimeog.

Virginia Pine; Reproduction, Growth and Management on the Hill Demonstration Forest, Durham, N. C. By G. K. Slocum and W. D. Miller. 52 pp. Illus. North Carolina Agric. Expt. Sta., Raleigh. 1953. Tech. Bul. No. 100.

Conservation

The Conservation Yearbook 1953. Ed. by Erle Kauffman. 320 pp. The Conservation Yearbook, 1740 K St., N. W., Wash. 6, D. C. $5.50.

Forest Economics

Taxation and Other Factors Affecting Private Forestry in Connecticut. By E. V. Zumwalt. 134 pp. Yale Univ. School of Forestry, New Haven, Conn. 1953. Bul. No. 58. $1.50.

Forest Products

European Timber Trends and Prospects. European Office of the UN, Geneva, Switzerland. 1953. $3.50.

A Directory of Secondary Wood Users; Wood Markets for Southern Illinois. By J. F. Hosner. 39 pp. Southern Illinois Univ., Carbondale. 1952. Mimeog.

Southern Illinois Timber Markets; A Directory of Sawmills and Other Timber Users. Comp. B. J. F. Hosner. 31 pp. Southern Illinois Univ., Carbondale. 1952. Mimeog.

Forest Resources

Forest Inventory Statistics for Flint Creek Watershed in Alabama. 16 pp. TVA, Norris, Tenn. 1953. For. Bul. No. 27. Processed.

Forest Inventory Statistics for Wayne County, Tennessee. 16 pp. TVA, Norris, Tenn. 1953. For. Bul. No. 26. Mimeog.

Forest Resources and Industries, Cumberland and Morgan Counties, Tennessee. By W. H. Ogden. 76 pp. Illus. TVA, Norris, Tenn. 1953. Mimeog.

Forest Statistics for Central Georgia, 1952. By J. F. McCormack. 44 pp. Southeastern Forest Expt. Sta., Asheville, N. C. 1953. Forest Survey Release No. 40. Mimeog.

Increasing the Efficiency of Airphoto Forest Surveys by Better Definition of Classes. By C. A. Bickford. 9 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1953. Station Paper No. 58. Processed.

Use of Aerial Photographs in Estimating Forest Drain. By C. A. Bickford. 10 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1953. Station Paper No. 59. Processed.

Logging and Mining

Handbook for Lumber Offices. 32 pp. West Coast Lumbermen's Association, 1410 S. W. Morrison St., Portland 5, Ore. 1953. $1.00.

Protection

Elements of Forest Fire Control. 109 pp. Illus. Food & Agric. Org., Rome, Italy. 1953. FAO Forestry and Forest Products Studies No. 5. $1.00 (Columbia Univ.).

Range Management

Between the Red and the Rockies. By G. MacEvan. 300 pp. Univ. of Toronto Press, Toronto, Canada. 1952. $4.00.

Germination and Growth of Bitterweed from Seed Matured on Plants Killed with Herbicides. By O. E. Sperry and J. Morrow. 3 pp. Texas Agric. Expt. Sta., College Station. Progress Rpt. No. 1580. May 9, 1953. Mimeog.

Grazing and Forest Economy. 161 pp. Illus. Columbia Univ. Press, 2960 Broadway, New York 27. FAO Forestry & Forest Products Studies No. 4. 1953. $2.00.

Proceedings, Range Specialists Meeting. 28 pp. U. S. Soil Conserv. Serv., Southwestern Reg., Albuquerque, N. M. 1953. Mimeog.

Silviculture

Experimental Pruning of Douglas-Fir in British Columbia. By J. M. Finnis. 26 pp. Illus. British Columbia Forest Serv., Victoria. 1953. Research Notes No. 24. Processed.

Guide for Reseeding Burned & Logged Over Ponderosa Pine Lands in the Southwest. By Fred Lavin. 11 pp. Illus. Southwestern Forest & Range Expt. Sta., Tucson, Ariz. 1953. Research Note No. 10. Mimeog.

1953 Flower Production of Coniferous Trees. By E. H. Engstrom. 3 pp. Oregon State Board of Forestry, Salem. 1953. Research Note No. 12. Mimeog.

A Preliminary Report on Tree Plantings as a Gorse Control Measure. By D. P. Lavender. 9 pp. Illus. Oregon State Board of Forestry, Salem. 1953. Research Note No. 11. Mimeog.

Rooting American Holly from Cuttings—Cold-Frame Method. By R. W. Pease, E. H. Tryon and W. W. Steiner. 20 pp. Illus. West Virginia Univ. Agric. Expt. Sta., Morgantown. 1953. Cir. No. 87.

Summary of Tree-Breeding Experiments by the Northeastern Forest Experiment Station 1947-1950. By J. M. Wright. 47 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1953. Station Paper No. 56. Processed.

Trees of Wisconsin; Their Ecological & Silvicultural Silhouettes. By S. A. Wilde. 44 pp. Illus. Univ. of Wisconsin Soils Dept., Madison. 1953. Processed.

Wood Preservation

Cold-Soaking Loblolly and Shortleaf Pine Fence Posts with Pentachlorophenol. By E. D. Marshall. 35 pp. Illus. Texas Forest Serv., Lufkin. 1952. Tech. Rept. No. 6.

Wood Technology and Utilization

Gluing Techniques for Beech. By W. Z. Olson and R. F. Blomquist. 20 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1953. Beech Util. Ser. No. 5. Mimeog.

How to Work with Tools and Wood, 181 pp. Illus. Stanley Tools, New Britain, Conn. 1952. $1.35.

Mechanical Properties of Wood and Paper. By W. W. Barkas, R. F. S. Hearmon and H. F. Rance; Ed. by R. Meredith. 298 pp. North-Holland Publ. Co., Amsterdam (Interscience Publ., New York). 1953. $7.25.

The Use of Sawmill Waste for Pulp in Eastern Canada. By G. E. Bell. 48 pp. Illus. Canada Dept. of Res. & Devel., Forestry Branch, Ottawa. 1953. Bul. No. 108.

Utilization of Sawmill Residue in the Southern Coast Region of British Columbia. By F. W. Guernsey. 31 pp. Illus. Canada Dept. of Res. & Devel., Forestry Branch, Ottawa. 1953. Bul. No. 109.

Society Affairs

Officers and Members of the Council, 1952-1953

GEORGE L. DRAKE, *President*
Simpson Logging Company
Shelton, Wash.

WILLIAM J. BROWN
Woodlands Department
Kimberly-Clark Corporation
Neenah, Wis.

D. B. DEMERITT
Dead River Company
6 State Street
Bangor, Me.

FRANK H. KAUFERT
School of Forestry
University of Minnesota
St. Paul 1, Minn.

ELWOOD L. DEMMON, *Vice President*
Southeastern Forest Experiment Station, Federal Building
Asheville, N. C.

C. OTTO LINDH
U. S. Forest Service
P. O. Box 1310
Albuquerque, N. M.

GORDON D. MARCKWORTH
College of Forestry
University of Washington
Seattle 5, Wash.

RICHARD E. MCARDLE
Forest Service
U. S. Department of Agriculture
Washington 25, D. C.

HENRY CLEPPER, *Executive Secretary*
Mills Building, 17th Street at Pennsylvania Avenue, N. W.
Washington 6, D. C.

EARL PORTER
Southern Kraft Division
International Paper Company
Mobile 9, Ala.

PERRY A. THOMPSON
Room 769
681 Market St.
San Francisco, Calif.

RUTHFORD H. WESTVELD
Department of Forestry
University of Missouri
Columbia, Mo.

Reports of Officers, Committees, Divisions, and Council Meeting

Fifty-third Annual Meeting, Society of American Foresters
Colorado Springs, Colo., September 14-17, 1953

The annual Society Affairs session was held in the Municipal Auditorium at Colorado Springs in the afternoon of September 15. President George L. Drake presided.

The Council met Sunday afternoon, preceding the opening of the Annual Meeting.

The reports which follow indicate the scope of the activities of the Society in behalf of the profession, and the members are urged to read them.

Report of the President

George L. Drake

This is the last Society Affairs meeting at which the present officers and the Council of the Society take part. It is timely to review the work of this Council and discuss with the membership certain objectives, some of which are not new but which I feel are worthy of your consideration. Objectives as involved as some of these cannot be attained or solved over night. They must be recognized, given ample study and, if sound, put into effect if the Society is to maintain a sound financial status and give the membership the full degree of service you desire.

At the outset I would like to express my appreciation of the splendid cooperation the Council has given me and the other officers the past two years. As you know, I came into office like an average member would, not too familiar with all the problems before the Society or aware of all its activities. As my education has progressed I have attempted to pass on to the membership, through articles in the JOURNAL, some of the important things I have learned about our Society functions and how it is providing services to the membership.

Besides representing the various forest regions of the country, your Council is representative of the various activities in our profession—men with a sound background of experience, from the forestry schools as well as from public and private forestry, making up its membership. The viewpoint of these men has been national rather than local, each trying to see all sides of the problem before them, and attempting to reach a decision that would be best for the Society. Most decisions were unanimous.

Also, I would like to express my deep appreciation of the fine cooperation that has been given me by the Washington office staff. The keen interest in all Society matters and the efficiency of Henry Clepper and Audrey Warren are so well known that anything I could say would be superfluous. Arthur Meyer, our editor, has fitted into the Washington organization very effectively. It has been a decided pleasure to work with these people.

The fine cooperation of the members, Council, and staff has made this a very

pleasant two years. I have had some previous experience in dealing with groups of this kind but none has kept me on my toes as have you men. The very nature of their work in the woods makes foresters keen observers, men with ideas of their own. And if some of the letters that have passed over my desk (on Society policies) are any criterion, you foresters are also observant of what is going on in your Society. This is as it should be; and even if sometimes you have failed to grasp or know all the facts that led to a certain discussion, your comments and criticisms have been very stimulating and helpful.

Accomplishments

This Council and the staff can look back on the two years of service with just pride in having maintained a reasonably sound financial position in spite of rising costs. As a New England Yankee naturally I have been interested in trying to see that our finances were sound.

A difficult problem (and at times a touchy one) has been that of qualifications for Junior Membership. The Council gave a great deal of time to trying to work out an equitable solution. The membership was contacted to find out their thinking, and out of it a solution was arrived at which more clearly defines the qualifications for this grade of membership, and at the same time encourages participation in the affairs of the Society by those whose background and education have not been strictly in the field of forestry but who do have, and who should have, an interest in forestry.

Another forward step was the decision to add to the staff a full-time editor for the JOURNAL. Arthur Meyer has brought to his job new ideas, and your comments have indicated your approval.

In response to a growing need for more articles in the JOURNAL on forest tree genetics, nursery practice, and planting, the Council has authorized the appointment of an additional associate editor of the JOURNAL to head up these subjects. This assignment will in turn relieve the associate editor for silviculture of the heavy load he has been carrying.

The program set by the previous Council, of securing more advertising for the JOURNAL, has worked out well without sacrificing the attractiveness of the publication. This is borne out by the very pleasing issue of this month, featuring our annual meeting. Lloyd Thorpe has done a fine job. His approach to the people he solicits ads from has been admirable; he has gained friends for the cause of forestry. Not every man can make friends in the process of soliciting advertising.

The securing of the grant from the Rockefeller Foundation of New York for the study of forestry research in America should result in the gathering of information that will be very helpful to those interested in research. This project, which is being carried on with the active cooperation of the influential National Research Council, reflects the prestige that has been built up by the Society through the years.

The Council has recognized that there was a need for working out a sound program of retirement for members of our staff, which would give them a measure of security somewhat in line with that of other similar groups with whom they have daily contact. The value of social security is well established; and a program has been worked out that is within the means of the Society to finance, and calls for equal contributions by those desiring to participate. Sam Broadbent of the Washington Section has been very helpful in working out this program.

One of the problems that has been before the Society for many years is adequate office space in Washington, D. C. Plans are under way to acquire more space in our present location, which will add to the efficiency of the office by having contiguous space rather than scattered offices and storerooms as in the past. One point in the new setup, which will be appreciated by the staff and those who visit Washington in the summer, is that air conditioning will be made possible in this change. This enlarged and improved office layout should take care of the Society needs for some time to come.

Future Objectives

Our Society has grown in stature by constantly striving to be of more service to its membership; and I feel the following objectives, designed to better serve our expanding membership and needs, should be given your serious consideration.

First, about Society finances. The Society has a Council committee, headed by Vice President Demmon, which is giving consideration to the financial needs of the Society. In this overall consideration there naturally arises the problem of increased dues. There may be a rumor that your Council is ready to propose an overnight increase in dues. We have no such intention at this time, although we must bear in mind that, after consolidating its findings, this might be a recommendation of the Council committee. But a dues increase cannot be imposed upon the membership. Any increase must carry by a two-thirds vote of the members voting.

In discussing with you the financial problems of the Society, I want to make it clear that I am talking about long-time financial planning. While it is true that the dues of several classes of membership do not completely meet the per-member cost of operation, the Society can still pay its bills out of total income. Because of increased income from advertising and other miscellaneous sources, we have been able to carry on, and I expect that we could maintain the status quo for several years to come. After a long struggle, we have arrived at the place where we are keeping our head above water and are likely to continue so, but we want to think now a little bit about swimming.

It has been a long haul to provide this sound financial foundation. There is no way to put a monetary value on the contributed time of officers, Council, members, and executive staff who have served your Society long and faithfully. Our problem now is similar to the personal financial problem which all of us face. There is available so much money—how shall it be spent? Although there has been significant improvement in Society activities, the 1949 dues increase has been pretty well absorbed by increases in costs. We are now about breaking even. The question then naturally arises, why more money? Believe me, it is not to squander on any project or activity that might come along, but to be expended wisely in promoting the objectives for which the Society was founded. Remember, this problem of financing is your problem, and it is your money we are discussing. Here then are some of the activities for which I believe increased income could be appropriately used.

Proceedings. There has always been considerable interest among the members for a Proceedings number containing all the papers presented at an annual meeting. At considerable cost, we issued two such Proceedings, for the 1947 and 1948 meetings. In my opinion, the publication of a Proceedings is a worth-while and necessary activity, if for no other reason than that it releases much needed space in the JOURNAL. But it's an expensive publication.

A Proceedings generally carries four to five hundred pages—equivalent to four issues of the JOURNAL OF FORESTRY. To provide all members with a copy of the Proceedings, it is estimated that the per-copy cost for printing alone would be $1 per member. If we printed only a sufficient number to sell to those members and outside agencies desiring it, the per-copy cost probably would be $3. (When a low number of copies is printed the per-copy cost is high because of the cost of typesetting. Once the type is set, additional thousand copies are relatively low in cost.) While we were successful in selling outside the membership some of the Proceedings which we printed, the sale did not anywhere nearly cover the cost. And yet, despite the expense of a Proceedings, this service is certainly one which a professional society should render to its members.

Membership Directory. Many of our members are interested in seeing another Society membership directory printed, but the cost of printing alone of such a directory would be at least 50 cents per member (you can see that printing comes high). Every service we provide a member costs money—someone has estimated that a dictated letter costs $1.25 (including time, material and postage)—so we must realistically appraise our services in this manner; but we must not overlook the fact that all service to members cannot be placed on a monetary basis.

Miscellaneous publications. Some feel that a need exists for publication by your Society of certain miscellaneous publications—monographs, perhaps on public relations and on the use of new research techniques and tools in the specialized fields of forestry.

Scientific Journal. Your Council has been asked to consider the publication of a strictly scientific journal, in addition to the JOURNAL OF FORESTRY. This proposed publication would carry generally articles of fundamental research in forestry. It is upon such research that the industrial forester and general practitioner build their techniques and practices. While these highly scientific articles might be of interest only to a limited number of Society members, the findings of a research group are basic to the profession of forestry and should be published. Your Council has not gone beyond the point of discussing such a publication because funds simply are not available.

Journal of Forestry. We need to do more about expanding our official publication, the JOURNAL OF FORESTRY—at least to keep up with the backlog of articles. Because of limited funds (and therefore no Proceedings or expansion of the JOURNAL), we are spreading papers presented at an annual meeting through the twelve issues of the JOURNAL. Consequently authors must wait from eight months to a year for publication of material. This situation should be remedied in some way.

Other periodical publications. As forestry has become more specialized, certain groups, feeling that the JOURNAL could not adequately cover their specialty, have broken away from the Society and formed professional societies of their own. This is as it should be, and there might be other specialty groups that in time will do the same. Nevertheless, there is the possibility that one or more journals covering the specialized fields of forestry could be published by the Society, to which members could subscribe in addition to receiving the JOURNAL OF FORESTRY.

Cumulated index. Badly needed is one cumulated index that will include the material contained in three cumulated indexes published to date. The indexes were prepared by members of the Appalachian Section, and you owe this Section a debt of gratitude for the service which it has rendered. But this job is becoming increasingly burdensome and it is an activity which your executive office should take over—in my opinion. The publication of such an index would give a source book of the important forestry periodical literature printed since 1902. Incidentally, Society Affairs and certain other items have not been recorded in the three indexes already published. Certainly there should be in your executive office for reference a complete index of *all* material which has appeared in its publications. This would seem to necessitate a card index currently kept up to date—a tremendous undertaking.

Projects. There are many more projects of unquestioned value to the profession which your Society should initiate and pay for. We have had several in the past. In 1929, forestry education inquiry; in 1946, state forestry surveys; in 1951, economics in forestry; and now in 1953, the forestry research project. All these projects are decidedly worth while, ones that the Society should undertake; but all of them have been subsidized by Foundations. We have been able to meet the financial costs of grading forestry schools, and we expect to continue to do so. However, in the light of our expanding national economy, there are many things that we need to know more about in forestry.

Perhaps it is now the time for a reappraisal of forestry education. Moreover there are certain studies in forestry education that your executive office could conduct: Who are forestry graduates and how many are there? At one time, all graduates of accredited forestry schools, irrespective of curricula, were eligible for Society membership. That is no longer true. There are now more nonapproved curricula than there are approved curricula. Just how many forestry graduates are eligible for membership—frankly, we do not know. What about the administration of state forestry agencies? Has it improved since the 1946 survey, and what is the status in the states that were not surveyed?

Additional service. We need to give more service and aid to the Sections, Divisions, and committees. All of them are charged with responsibilities with respect to membership program and stimulation of forestry in their local areas which cannot easily be met because of full-time jobs. The Sections have grown tremendously. Some Sections now have a membership almost equal to the total number of members at the time your executive office was first established. These busy members should be relieved of time-consuming details.

Financial management. Long-term sound financial management dictates the need for sufficient reserves for a rainy day and maintenance of gains already made. This means adding periodically to our reserve fund. The business formula for a reserve fund is one-half the amount of annual expenditures—in our case that would be approximately $60,000. I don't suggest that we can in a short time accumulate any such reserve as this. Because we are a growing profession I believe that our income should be put to work—invested in professional activities that will eventually increase the importance of the profession. But our reserve fund very definitely should be increased. Including a permanent fund of $5,000, it is now no more than $20,000.

By "reserve fund" I don't mean a fund that cannot be touched. Above an established point, it should be used—invested in sound professional projects. In fact, we have been doing just that. The *History of Forestry* was financed from this reserve fund. When the cost was recovered (and it has

been), the amount used was replaced. About $9,500 has already been expended for the preparation of *The Foresters' Manual*. Some day this cost will be recovered and replaced in the reserve fund. There are other worthwhile projects that can be financed from the reserve fund, but it is obvious that we must periodically build up this fund. In other words, we must first have the money before we can appropriate it, no matter how important a project may appear.

Now in closing—I have touched briefly upon the Society's financial problem and mentioned some of the activities for which increased funds could be used. There are others equally worth while. As members of the Society, this problem basically is yours. You pay the money; you call the tune. The decision rests with you. I hope to see the day when the Society has grown to the need of its own building and to the time when we will be a clearing house for all professional conservation organizations. I'm not talking about taking over the activities of the American Forestry Association, which does such an outstanding job in the popular conservation field, nor of the National Lumber Manufacturers Association, which does an equally good job for the industrial field. I mean the professional field where research will provide the tools and techniques for the promotion of the profession of forestry. That's what we are organized for—the advancement of the profession of forestry. I believe that every one of you wants a dynamic, growing, progressive Society. Let's push toward that goal with all the energy, knowledge, and funds we can muster.

Report of the Executive Secretary

Henry Clepper

So far the year 1953 has been a good one for forestry. Employment is at its highest peak in history. The continuing increase in the employment of foresters by private and industrial organizations is professional, healthful, and desirable.

Wherever we look—at employment, at education, at research, at the increasing application of forestry on the ground—we see signs of progress, of growth, of encouragement. As I enter my 33rd year of work as a forester and my 16th year of employment by the Society, I am more optimistic than ever before of the future of forestry in America.

New Schools of Forestry

During the current year four institutions of collegiate rank consulted the Society about offering professional curriculums in forestry leading to a degree. In all cases the Society provided the institutions with pertinent data on costs and the bases for accreditation, and gave such additional information as would be helpful to each institution in determining whether it could afford to start professional work in forestry.

One of the four institutions is now offering sound courses in forestry to preforestry students and students of agriculture, and is not inclined to enlarge its program to the full professional, degree level. The other three institutions have presumably abandoned the proposal.

Two additional colleges consulted the Society about starting courses in forestry not at the professional level, and were aided with information and encouraged to go ahead.

For the information of our members, the official position of the Society, by declaration of the Council, regarding new schools of forestry, is this. Because of the adequacy of existing schools of forestry in the United States to supply the demand for professional foresters, the Council recommends against the establishment of new schools or departments for professional training. However, the Society welcomes the introduction of nonprofessional courses in forestry as a matter of general education and as part of the training of students in agriculture.

Membership

As of September 1, membership totalled 9,606 as follows:

Student Members	543
Junior Members	4,551
Members	3,682
Affiliate Members	477
Associate Members	214
Fellows	62
Honorary Members	14
Corresponding Members	63
Total	9,606

Membership on September 1, 1952 was 9,082. The net increase for 1953 to date has been 524.

Members whose dues are not paid for 1953 total nearly 700. It is expected that one-half these "delinquents" will pay their dues before the end of the fiscal year (November 30), leaving about 350, or less than 4 percent of the total membership, to be dropped for nonpayment.

To show you the extent of annual membership terminations: in 1952 there was a total membership loss of 469, by death, resignation, and failure to pay dues. At least half of this loss was through failure to pay dues.

So far this fiscal year, there has been a total of 1,488 membership cases processed. This number includes 428 Student Member applications; 410 advancements from Student to Junior Member; 8 advancements from Affiliate to Junior Membership; 289 applications for Junior Membership; 220 advancements from Junior to full Member; 116 applications for Affiliate Membership; 10 applications for Associate Membership; 6 applications for Corresponding Membership; and 1 election to Honorary Membership.

A membership campaign has been approved by the Council to go into effect October 1. It is hoped to add 1,000 new members by the end of 1954. To offset terminations this means we must get about 1,500 new applications for the entering grades—Student, Affiliate, Junior, and Associate Membership.

With the decrease in forestry school enrollment, the membership potential is reduced. In 1950, for example, 2,321 undergraduate degrees were granted in all schools. In 1952 the total was 1,160, less than half as many.

Currently, the proportion of graduates of all schools entering the Society each year averages 30 percent. As enrollment drops, the actual number of potential new members drops accordingly.

Finances

As was previously reported, our income for the fiscal year 1953 is expected to be about $113,000. Expenses will not exceed income. In fact, there should be a net surplus of $2,000—not much, to be sure, but evidence that the Society is living within its income.

Although the budget for 1954 will not be submitted to the present Council until later in the fall, and will then be subject to review by the incoming Council (elected December 5), we anticipate only one significant change. Most costs, including printing of the JOURNAL OF FORESTRY, are expected to remain substantially the same.

The one major increase in the 1954 budget will be in office rent, now costing $3,888 annually. Additional space in the same office building is expected to be available about January 1, increasing our rent to about $6,000.

This higher rent will still be appreciably less than prevailing rates for

comparable space in Washington office buildings. The Council, and many members who visit the Society headquarters, have long realized that our present office and storage facilities, scattered as they are in two buildings on four different floors, are awkward and inconvenient. At long last we hope to correct this situation.

You should know that the executive staff has always tried to spend Society funds—your money—wisely and economically. For example, in the 1953 budget, as approved by the Council, is an item of $2,400 for the replacement of clerical help. A reassignment of duties in the office staff has permitted us to take on the work load without taking on another employee. Hence, the money was not spent even though authorized.

Forest Types Bulletin

The long-awaited bulletin *Forest Types of the United States and Canada* has been completed and is being printed. We hope to have it ready for distribution in October or November.

It should be well worth the cost of $1 for it will be positively the latest and most authoritative publication on the subject. To F. A. Eyre and his committee (William A. Dayton, Daniel Den Uyl, Ralph C. Hawley, and Philip R. Wheeler) the forestry profession owes much for a job well done.

Foresters' Manual

During the past spring and summer we ran into unexpected technical difficulties in certain chapters of the *Foresters' Manual*. Additional delays in the publication of the book were therefore inevitable.

However, the editorial committee hopes to have the final typescript ready to turn over to a commercial publishing firm late this fall. With luck—I have ceased making predictions as to the publication date of this manual—the book should go on sale in 1954.

Report of the Editor
Arthur B. Meyer

The Society's full time Office of Publications has been in operation about a year. It is part and parcel of the executive office, which office handles all business matters of the Society and follows out the instructions and furthers the policies of the Council.

The duties of the office of publications consist first of publishing the JOURNAL OF FORESTRY; secondly, of editing and arranging for publication of other books, bulletins, and material that the Society originates; and, thirdly, of such miscellaneous activities as may be required, not necessarily connected with the above.

During the past year, approximately three-fourths of the editor's time and practically of the time of the stenographer-assistant have been devoted to the JOURNAL. This has been a result of the status of the other main projects in the hands of S.A.F. committees, such as *The Forester's Manual* and the *Forest Type Bulletin*. The immediate future, however, is going to require a much greater proportion of time on projects other than the JOURNAL.

Due to the fact that most of our effort during the past year has been expended on the JOURNAL and also to the fact that this is the activity of most immediate interest to the membership, this report deals solely with the JOURNAL.

Ten years ago while S. T. Dana was editor-in-chief, he wrote a letter to the associate editors which contained the following sentence, "I have assumed that the principal function of the JOURNAL is to serve as a forum for the presentation of current research and practice for the entire field of forestry and for the expression of points of view on matters of policy."

I do not believe that the JOURNAL's function could be described any more clearly in any less words than that.

That is the assignment which has guided the JOURNAL through the years —the coverage of research and practice for the entire field and the discussion of matters of policy related to American forestry. This will no doubt continue to be its assignment in the future, so long as the JOURNAL is the only professional periodical of the Society, and subject to future evolution of our definition of the word "forestry."

The basic problem of the JOURNAL is exemplified in the scope and range of the field of professional forestry in America which it is assigned to cover.

During the years, a great many policy matters have been hammered out. Their solutions represent today's many-angled attack upon the job of forest conservation and management in America. There are still questions; there will be more in the future. But the fact remains that, though policy matters require less space in the JOURNAL now than in the past, progress in the field of research and practice has been tremendous.

The area of required coverage gets no smaller.

Now, the method by which the JOURNAL undertakes to serve as a forum for research, practice, and policy varies somewhat in its different departments. The publication of Articles, Notes, and Points of View obviously serves directly as a forum.

The reviews of books, the listings of current literature, and certain portions of forestry news serve as a forum of American forestry, though in a somewhat less direct manner.

In addition to this, we have assigned to the JOURNAL the function of covering the internal affairs of our Society, of reporting news items about individual foresters, and of giving biographical sketches now and then of selected persons, in our We Present department.

The proportion of space given to the various departments is more or less traditional, and seems to meet with general approval, according to the questionnaire sent out last winter.

Articles, Notes, and Points of View take up about 57 percent of a year's pages. Reviews and Current Literature take up another 7 percent, while News also uses 7 percent. Society Affairs occupies 11 percent of the space.

Lastly, the JOURNAL sells advertising space, partly as a service to its readers, but mainly to produce a cash income. This uses up 16 percent of a year's space, excluding covers. It produces currently a net income of about $8,000 which covers some 20 percent of the printing and paper costs of the magazine.

We then determine the total amount of space that the JOURNAL is to use in a year by budgeting money for its publication. Presently, we publish 928 pages a year, exclusive of covers, in one 96-page issue, three 64-page ones and eight issues of 80 pages. This furnishes a total space available that is equivalent to that in 8 or 10 textbooks. Half of this total space is devoted to articles.

What is contained in this half of the annual space — the articles — is probably the one subject most discussed about the JOURNAL. There are foresters who feel that far too much emphasis is given to research and not enough to practice. There are others who feel that the JOURNAL should be devoted exclusively to putting on permanent record the results of research and the methods by which those results are obtained.

The, by no means minor, responsibility of the editorial board and the

editorial staff is to attempt to make this article space serve as the wide-covering forum that it should be. Two primary factors control this:

First is the amount of space available to cover the necessary range with some degree of proportion and balance.

Second is the nature of the material which is received for possible publication.

After the September issue was put out, there were 50 articles, accepted, in final form, and awaiting publication. On a mathematical basis, this would mean a minimum wait of 6 to 7 months between final acceptance and publication, but a couple of more months' leeway must be given to help make each issue as balanced as possible and to take care of some of the last-minute emergencies of putting a magazine together.

During 1952, articles were submitted at the rate of 11 per month. So far during 1953, they have been coming in at the rate of 13 per month. During one 4-week period this summer they arrived one per day. They are published at the rate of 9 or 10 per month. Ten percent are rejected. These are usually submissions from other than S.A.F. members and are on inappropriate subjects. Another 10 percent is put in the indefinite status of requiring major revisions on the recommendation of the associate editors.

This sounds as though we need more space or fewer articles. The reduced number could come from a very careful selection. This may have to be done, but considering how skimpily we cover the field, and considering the generally high quality of most of our submissions, more space is a much more desirable solution.

Added to this fact of the regular submissions, which pile up behind their crowded outlet, is the problem of annual meeting papers. To publish all papers from an annual meeting would take up about four issues of the magazine. As a partial solution to this problem, meeting papers are submitted to the same scrutiny as regular submissions, from the standpoint of the magazine, and only a portion of them published. This compromise procedure is not too satisfactory to the JOURNAL and certainly not to the authors of papers. A delivered paper can be excellent in its content, its construction, its timely importance, and its place in an organized program and yet have a quite different value as a unit article in the magazine some months later.

If we were financially able, as some professional societies, we could have a number of periodical publications. As an example:

One could be devoted to current research. Another, say the present JOURNAL, could cover current practice, and policy discussions, and a summary of significant events and developments. A third could then carry the news of Society affairs and the news about people in forestry.

So long as we have one publication, it must serve several purposes and so long as this is the case, the major problems are going to hinge about the amount of space available to publish articles.

Space is necessary to cover the wide field of the JOURNAL'S assigned coverage, and to give more people more of what they need. Space is necessary to give reasonably prompt publication to worthy material, and to serve the need to be current and keep abreast of developments. The question of space indirectly influences the quality of articles submitted and it alienates groups within the profession with specialized fields of interest.

There are several ways of making more space, and therefore helping the JOURNAL be of more value to more people. Some are:

1. We could make our standard issue 96 pages instead of 80. This would add 192 pages a year and make room for about 48 more articles. Miss Warren tells me this would cost about $7,000 per year for additional paper and printing charges.

2. We could publish Society Affairs separate from the JOURNAL. This would free about 120 pages per year. The Society did this at one time. Its cost varies with the method, but could probably be done satisfactorily for about $4,800 per year.

3. We could publish proceedings of the annual meeting. This would accomplish several things in addition to leaving open anywhere from 200 to 300 pages of the JOURNAL. Miss Warren tells me this can be done at a cost of about $1 per member. We have lost money on it on two occasions, but this need not preclude its consideration again for the future and it seems to me to be very desirable.

I have attempted to point out the problem of space in the JOURNAL and indicate how it contributes to other problems. I have mentioned what seem to be some practical possibilities for solution. If it is felt by the Society that this deserves consideration, all possibilities should be given careful and detailed study.

The subject matter of articles warrants brief mention. This year shows some changes over last. There is a definite increase in the submission of articles dealing with pathology and entomology, which is quite appropriate. There has been some increase in those dealing with influences and soils; in wildlife, and in utilization. There has been a slight, but not nearly sufficient, increase in those dealing with forest management and industrial forestry. Silviculture remains 'way at the top of the list of subject matter, although this subject is often directly related to other classifications.

As to our authors, the men in research and in teaching continue to account for about $\frac{2}{3}$ of all submissions. Solicitation of articles from the 30 percent of our membership in industrial work is producing a slight increase, but not nearly a large enough one, for these men account for only 7 percent of this year's submissions.

I would like to close on a personal note, with your permission. First, I would like to express my thanks, and speak for all of us, to the associate editors. They are being prompt in their decisions, are being frank and helpful with authors, and are of incalculable value to the editorial staff and to the whole society. Secondly, I would like to say that, as a fulltime employee, in what is a new status to the Society, I am sincerely appreciative of the interest and the general cooperative friendliness I have received from the membership of the Society.

Report of Accrediting Committee

Since our last report, presented at the Montreal meeting in 1952, we have performed examinations of the forestry curricula at certain institutions. Because of their confidential nature, they will not be elaborated upon in this report.

During the year, your Committee has paid close attention to the developments of the National Commission on Accrediting, especially as these developments are related to the accrediting activities of the six regional education associations, through which the National Commission has asked that all accrediting in the future be conducted.

The Committee is prepared to carry out the formal offer of the Society to cooperate in these activities with the regional associations and with the representatives of the accrediting agencies of other professional groups. In doing so, the Committee will comply with the resolve of the Council

that the Society shall continue to assume its full responsibility for the improvement of professional forestry education.

In this connection, the attention of all members is called to the statements of the Council, which appeared in the July 1953 Journal. So far, the Committee does not foresee an opportunity to cooperate with any regional association, in the examination of an institution with a curriculum in forestry, prior to October 1954.

The Committee has started its deliberations to strengthen the standards used in the evaluation of forestry curricula, to the end that forestry education may keep pace with the profession. In these activities, the Committee most earnestly requests the cooperation of all members of the Society but especially of those members who are engaged in teaching.

MYRON KRUEGER, *Chairman*

Report of the S.A.F. Council Committee on Membership

The changes in the Constitution recommended by the Council to simplify, improve, and bring membership procedure up to date, were published in the January, 1953 JOURNAL and were submitted to the membership for vote in February. These changes were accepted by the membership by an overwhelming vote, well over 90 percent voting in favor of the changes. These changes, together with changes in By-Laws affecting membership which were made by the Council, are now in effect.

The changes suggested by the Council and which you approved accomplished the following:

1. They simplify membership procedure by relieving the Council and Council Membership Committee of many of the details formerly handled in connection with admissions and automatic advancement. However, in cases where there is question regarding admission or advancement, the responsibility still rests with the Council.

2. They provide for a new membership grade, Affiliate Grade C, which admits to membership graduates of nonapproved curricula in accredited schools in products, wildlife, and range.

3. They define membership grades and qualifications for admission and advancement so that they are more understandable and clear-cut.

The Council is convinced that these changes were necessary and that they are very desirable. Our recent experience with membership procedure has been fairly satisfactory and the procedure is really not as complicated as many members believe. We feel very strongly that we can function satisfactorily under the present requirements and that we should operate under them for a few years at least without major changes to see how they will work out. However, it should be recognized that we are a relatively young and developing profession and, while we must maintain high professional standards, we must still recognize that future changes or modifications are inevitable and desirable. The membership grades provide an opportunity for entrance into the Society of all qualified and interested individuals. In addition, they provide a means of excluding the unqualified.

The educational requirements for entrance into the voting Junior Member grade and the requirement that advancement to this grade is predicated on the acquisition of professional forestry knowledge through self study and experience, give us a basis, not yet very strong, but still a basis, for being called a professional society.

In the joint meeting of the Council and Section Delegates on September 13, at which all of our 21 sections were represented, the questions of Society dues, finances, and membership requirements were thoroughly discussed. We feel that this and similar sessions at future meetings should result in a better understanding of our problems as a Society. The desirability of Sections electing to membership in the Sections certain individuals interested in forestry and whose association with the Society in some capacity is desirable, rather than proposing such individuals for immediate membership in the national Society, was discussed and generally approved as a means of strengthening the Society and still maintaining our professional status.

As a means of increasing Society membership and income, an intensive membership drive is planned for the coming year. We solicit your active participation in this effort to add 1,000 new members during this year and in advancing to the Member grade as rapidly as possible all eligible Junior Members.

Our executive secretary (Henry Clepper) and business manager (Miss Audrey Warren) have presented you with information on Society membership. The growth of the Society in members, in strength, and its development as a professional Society with a true basis for such classification is indeed gratifying. These have been the objectives of all past Councils and Membership Committees and they will continue to be the objectives of your representatives in the future.

D. B. DEMERITT
C. OTTO LINDH
F. H. KAUFERT, *Chairman*

Report of Committee on Manpower

The Committee on Manpower reported a year ago that adequate foresters were available to fill essential requirements of government and industry. The Committee stated that it would continue to be alert to needs and, if action was necessary, it would be taken.

During the past year forestry manpower has increased rather than diminished in availability. The Committee therefore took no action during the past year.

HENRY BAHR
GEORGE W. DEAN
FRED MILLER
PAUL SCHOEN
JOHN SHANKLIN
HARDY L. SHIRLEY, *Chairman*

Report of Committee on International Relations

The last report of your Committee on International Relations discussed the forthcoming Fourth World Forestry Congress. No definite date has yet been set for this meeting, but it appears probable that it will be held early in 1955 in Dehra Dun, India.

Past World Congresses have been held during the summer, which, from the standpoint of foresters connected with schools, has been a much more favorable time. Unfortunately, climatic conditions in India make summer undesirable for meetings.

As in the past, your Committee hopes to be able to facilitate arrangements for delegates and observers attending this World Congress. At as early a date as possible, it will make available to all interested members matters of transportation, organization, agenda, field trips, hotel accommodations, visa and health requirements. Since this is the most important international event in the field of forestry, it is hoped many members

will find it possible to attend.

Only one international meeting of interest to foresters will be held in 1953. This is the Eighth Pacific Congress, to be held November 16-28 in Quezon City, Philippines, under the auspices of the Republic of the Philippines and the National Research Council of the Philippines.

The Pacific Congress was inaugurated in 1926 for the purpose of coordinating information on resources and problems of the Pacific area. The Congress has a Standing Committee on Forest Resources, on which H. B. Donaldson, Tom Gill, Paul J. Shank, and Raymond A. White are serving, and of which Stephen N. Wyckoff was formerly chairman. Plans for the forestry activities are being made by Dean Florencio Tamesis, director of the Philippine Bureau of Forestry. These include a draft report of the Standing Committee on Forest Resources, the U. S. section of which was contributed by the chairman of the Committee on International Relations.

For 1954 the only meeting yet scheduled of interest to foresters will be the Eighth International Congress of Botany, in Paris, France, July 2-14, 1954. This Congress will be preceded by field excursions in France, followed by excursions which will include the Hyeres Islands, Corsica and Tropical Africa (Senegal and Mauritania) and Equatorial Africa (Ivory Coast and Guinea). Details of the program have not yet been received by your committee, but upon their receipt will be transmitted to the JOURNAL OF FORESTRY for announcement to the membership. In the meantime, anyone wishing earlier information regarding the Congress may write the Secretary-General, Eighth International Congress of Botany, 292 Rue Saint Martin, Paris 3, France.

Outlined in your committee's report for 1952 was a plan to arrange for bringing a party of Latin American forestry educators to this country under U. S. government auspices, in order to better acquaint them with U. S. methods and equipment for teaching forestry and conservation.

Because of drastic reorganization within the foreign aid agencies, this project is still pending, but as soon as conditions become stabilized, efforts will be continued to push this study tour through to completion. Thanks to the cooperation of the Council of Forestry School Executives, several schools have indicated a willingness to cooperate in this proposed tour.

It is possible that this group may meet at Puerto Rico for briefing and an examination of forestry work there, then come to the continental United States for a tour of several forestry schools, a visit to the Forest Products Laboratory, and an examination of logging methods on the Pacific Coast.

During the year, your committee has endorsed four applications for Corresponding Membership in the Society, and is recommending to the Council the election of one foreign Honorary Member. The committee wishes again to call attention to the service that Society members can perform by submitting nominations of foreigners for both these grades.

The committee during the past year has continued to supply letters of introduction and suggestions for itinerary to American foresters going abroad, and to an even greater number of foreign visitors to the United States.

It may be remembered that during the years immediately following World War II your committee arranged for sending CARE packages to relieve the suffering of certain foresters abroad. By 1950 this situation had eased to such an extent that no further calls were made upon the Foreign Relief Fund, which had been set up with contributions from Society members. There now remains a sum of $37 in this fund which will no longer be needed for the original purpose, and your committee recommends to the Council that this sum be turned over to CARE for general foreign relief.

One change has been made in the composition of the committee since its last report: E. C. Crafts, because of assuming new duties in the U. S. Forest Service, has asked to be relieved, and has been replaced by V. L. Harper. In order to secure better geographical representation, the committee is also recommending the appointment of two additional members, one for the Far East, and one for Central America.

As in the past, your chairman has served as the Society's representative on the USA-FAO Interagency Committee.

Your committee has continued its efforts to assist in placing qualified foresters in the foreign resource-aid projects of government. On the whole, these efforts have been well rewarded, but during the past year they have been hampered by the uncertain outlook regarding foreign programs. To date, members of your committee and individuals within the U. S. Forest Service have been working, by personal contacts, to bring about greater appreciation of the need for a definite policy of management for forests and wild lands as an integral part of all resource development. Reorganization of the foreign aid agencies, once accomplished, may offer further opportunities.

I. T. HAIG
V. L. HARPER
LEROY HUNTINGTON
BARRINGTON MOORE
LYALL E. PETERSON
J. W. B. SISAM
J. H. STOCKELER
TOM GILL, *Chairman.*

Report of the Committee on Safety

While waiting to hear from the Council about its action regarding endorsement of the management approach to accident prevention as submitted in our last year's report, the Committee, as a group, has been inactive. The chairman also thought that it would be wise to provide for a period of inactivity while the SAF membership thought about and studied this Four-Point Policy approved by the Council in 1952:

The Council recommends that foresters:
1. Acquaint themselves with the safe practices applicable to occupations related to their fields,
2. Acquaint themselves with the procedures for getting safe practices into use,
3. Actively participate in safety programs, and
4. That schools of forestry indoctrinate students in the principles of safety.

Individually, however, members of the Committee on Safety have been active in the promotion of accident prevention among foresters. Contacts have been made with these agencies:

Several forestry schools, including conducting some safety training sessions.

Utah State Agricultural College to lay the groundwork for a proposed movie on integration of safety in curricula.

Governors Safety Conference, State of Washington.

The newly formed Safety Committee of the Association of State Foresters.

Western Forest Products Safety Conference.

A group of log truckers under the auspices of the Washington Motor Transport Association.

American Forestry Association's

Higgins Lake Conference.

Participating in Committee work of the National Safety Council.

Participating in meetings allied to forestry at the National Safety Congress.

American Society of Safety Engineers.

The Committee on Safety is now ready to more aggressively expedite our Four-Point Policy. It hereby offers its services to any member or school of forestry desiring our counsel on specific safety problems.

If the Council approves our last year's recommendation, "that foresters urge that management give the necessary impetus to the adoption of safe methods and practices," this counselling service can be further expanded. Injury rates in the woods still continue to be among the highest in the United States. Thus it becomes readily apparent that we can contribute greatly to better forestry by reducing injuries in the woods.

SETH JACKSON, *Chairman.*

Report of the Committee on Civil Service

The forest and range options of the Junior Agriculture Assistant examination, given on November 22, 1952, consisted of two parts. The first part was a general psychometric test required of competitors for all options. The second part consisted of 50 subject matter questions for all applicants in the forest and range options. Of these 50 subject matter questions, 40 of the questions were the same for both forest and range options. Those who selected the forest option took 10 additional questions dealing with forest management, and those who selected the range option had 10 additional questions dealing with range management. Applicants who selected both the forest and range options were required to answer all the forestry and range management questions for a total of 60 technical questions. This dual type of examination was in keeping with the recommendation of the Committee on Civil Service made at Biloxi in December of 1951.

The members of the Council of Forestry School Executives registered no complaints or criticisms of the first part, i.e., the general aptitude part of the examination. However, a very wide dissatisfaction was registered about the second, or technical part, of the examination. The severe criticisms included (1) insufficient time to answer the type of technical questions asked (50 minutes were allocated to 50 questions), (2) too much emphasis on range management in the forest option, (3) competitors handicapped by the early date of the examination as many of the student applicants had not yet completed the subjects on which some of the technical questions were based.

The eastern applicants felt that the examination favored the western schools because of the many questions on range management and ponderosa pine; whereas the western applicants felt that the examination favored the eastern schools because there was too much emphasis on forest management and not a single question asked on Douglas-fir. In short, almost all of the applicants were dissatisfied with the questions in the technical part of the examination. All of the members of the Council of Forestry School Executives were invited to submit their criticisms and recommendations concerning the examination. These comments were then forwarded to H. D. Cochran, chief, Division of Personnel Management of the Forest Service. Despite these criticisms though, the majority of the forestry schools still favor the dual type examination and want to see it continued, if remedied.

We have been advised that this year's examination will again be a dual type examination. The Civil Service Commission has stated that much more time will be allocated for the technical part of the examination and also that it will be offered later than last year's examination, possibly in the early part of 1954. Thus, an attempt will be made to remedy two of the most severe criticisms of last year's examination.

This committee is grateful to the Forest Service and to the Civil Service Commission for accepting our criticisms and for attempting to remedy the causes for our dissatisfaction. We also appreciate the action of the Civil Service Commission in changing its rating procedure for last year's examination. The technical part of the examination was not rated separately, as originally planned, but was credited in conjunction with the score received on the general test. Thus, failure to complete the technical examination due to the inadequate time element, was not as critical a factor in the rating as it might have been under the original rating procedure.

This committee approves the recent letters addressed to Secretary of Agriculture Ezra T. Benson and Philip Young, chairman of the Civil Service Commission, by Henry Clepper, executive secretary of the Society, and Dr. R. J. Preston, chairman of the Council of Forestry School Executives, in which Mr. Clepper and Dr. Preston urge retention of the top positions in the Forest Service in the career Civil Service. The motivation for these letters was occasioned by the new presidential order that establishes procedure whereby policy and confidential positions may be removed from Civil Service and placed in Schedule C by department heads under agreement with the Civil Service Commission. J. E. Coke, Assistant Secretary of the Department of Agriculture, answered on April 30 that, "at least for the present time we are including no Forest Service personnel in this Schedule," and the Chairman of the Civil Service Commission replied on May 19 that, "should positions in the United States Forest Service be recommended for Schedule C by the Secretary, the Commission will give full consideration to the aspects you mention."

D. S. JEFFERS
E. R. MARTELL
W. C. PERCIVAL
D. J. WEDDELL
M. K. GODDARD, *Chairman*

Resolutions on Forest Fire

The following statement, supported by the signatures of 45 members, was presented at the Society Affairs session on September 15 by George A. Craig in behalf of the signatories.

Following its presentation, Mr. Drake announced that the two resolutions would be referred to the incoming Council due to take office January 1.

The Place of Fire in American Forestry

Fire has always been a major problem in maintaining the forest resource. This problem is now accentuated by the demands of more intensive forest management and the threat of conflagrations to the national security. There is need for new knowledge and new methods to combat fire. Parts of the country formerly considered to be of low fire risk have been experiencing critical fire losses in recent years. Custodial protection attitudes which complacently accept a specified acreage burned every year are now obsolete.

The challenge of fire must be met by the forestry profession under the leadership of the Society of American Foresters. Many members favor the formation of a subject division on fire protection. However, the disadvantages of this proposal are recognized, and before such action is formally proposed alternative measures are recommended.

As a start toward bringing fire to its proper place in forest land management, the following two resolutions are presented:

1. Be it resolved that the President, with the advice of the Council, immediately appoint a chairman to head a national fire-study committee. This committee will be composed of chairmen of Section fire-study committees to be appointed by Section officers. The national committee will present at the 1954 annual meeting a progress report recommending future Society action.

2. Be it resolved that, in the 1954 annual meeting, a full general session be devoted to a review of forest fire control, including the historical background, current status, and outlook for the future.

Division of Forest Economics and Policy

The meeting of the Division of Forest Economics and Policy was held at 8 p.m., September 14, William A. Duerr acting as chairman in the absence of Eugene V. Zumwalt. With approximately 50 people in the Little Theatre when the meeting opened, attendance gradually increased until some 75 were counted prior to presentation of the last paper.

A series of three papers was presented—an integrated program, concerned with the Engelmann spruce beetle outbreak in Colorado during the past decade. "The Technology of the Problem" was the subject of the first paper, delivered by Bill H. Wilford of the Division of Forest Insect Investigations, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Fort Collins, Colo.

This was followed by a paper on "Control and Salvage Policy" by Arthur L. Nelson, chief of the Division of Timber Management in State and Private Forestry, Region 2, U. S. Forest Service, Denver, Colo. This paper was read by Elmer Bacon, since Mr. Nelson was unable to attend.

The final paper of the evening was presented by Henry J. Vaux, professor of forestry, University of California, the title of the paper being "Economic Interpretation."

A business session was held immediately following this meeting. The report of the Committee on Taxation was carried over to next year. The acting chairman reported that the Committee on Scope and Method of Research in the Economics of Forestry had completed its work with the publication of the book, *Research in the Economics of Forestry* and had been discharged with thanks by Chairman Zumwalt.

Appointment of a new committee—Committee on Research on the Economics of Forestry—by Chairman Zumwalt was announced. This standing committee has, as its purpose, the investigation of the need for and progress in research in the field of forest economics. Members of this committee are: Charles H. Stoddard, Minong, Wis.; Herbert S. Sternitzke, New Orleans, La; William A. Duerr, Syracuse, N. Y. (chairman). A fourth member, preferably representing industry on the west coast, is to be appointed.

The report of the nominating committee (Albert C. Worrell, Athens, Ga.; Robert W. Cowlin, Portland, Ore.; Allyn M. Herrick, Lafayette, Ind.) was presented by Chairman Worrell. The following Division officers were nominated and duly elected for the coming year:

Chairman, William A. Duerr, Syracuse, N. Y.

Vice Chairman, Henry J. Vaux, Berkeley, Calif.

Secretary, M. B. Dickerman, St. Paul, Minn.

Executive Council, James W. Cruickshank, Asheville, N. C., and G. R. Gregory, Ann Arbor, Mich.

The meeting adjourned at 10:15 p.m.

G. R. GREGORY,
Acting Secretary.

Division of Forest Management

The second annual meeting of the Division of Forest Management of the Society of American Foresters was held at the Antlers Hotel, Colorado Springs, Colorado, from 9 a.m. to 5 p.m. on Wednesday, September 16, 1953. DeWitt Nelson, chairman of the Division, presided. Over 200 members were in the room at one time to listen to many of the papers.

The program was divided into three sections: forest inventory, including both mensuration and photogrammetry; forest administration, or administrative management; and forest protection, dealing with nonsilvicultural aspects of forest fire, insect, and disease control.

Papers in forest inventory included discussions of continuous inventory procedures by Ashbel F. Hough and Dean Cutler; a paper on forest aerial photogrammetry by Kendall B. Wood and a following discussion led by Herbert Jensen; and a paper on simplified computational procedures by Stephen H. Spurr.

Administrative management was dealt with on a federal basis by Earl W. Loveridge, assistant chief of the U. S. Forest Service, and on a state basis by B. L. Orell. DeWitt Nelson led the discussion of these papers.

Forest fire control and the control of the Engelmann spruce bark beetle occupied the attention of the group during the sessions on forest protection. Mayhew Davis, A. A. Brown, and Jack S. Barrows presented papers on fire; while Roy H. Nagel and Walter H. Schaeffer talked on the bark beetle.

Officers were elected for a term of one year to serve through the next annual meeting of the Society.

Merle Lowden, assistant regional forester of Region 9, U. S. Forest Service, Milwaukee, was elected chairman.

Myron Savage of Rayonier Corporation, Hoquiam, Wash., was elected vice chairman with the expectation that he would succeed to the chairmanship in 1955 and preside at the Portland meetings. Keith Arnold of the University of California, Berkeley, was elected secretary.

These officers represent the fields of administrative management, forest inventory, and fire control respectively.

Since the Division has no committees, there were none to report or be appointed. No other business was transacted.

STEPHEN H. SPURR,
Secretary.

Division of Forest Products

The 1953 meeting of the Division of Forest Products was held jointly with the Division of Private Forestry in the municipal auditorium in Colorado Springs, Colo., September 14, 1953. The private forestry portion of the meeting was held during the morning session and the forest products meeting which this report covers took place in the afternoon.

The general theme of the meeting was "Trends and Possibilities in Forest Products Utilization in the Northern Rocky Mountain Region." Chairman Fred E. Dickinson presided. Slightly over 100 members were in attendance.

The five papers as listed below were given and from the reaction of the group it was evident that considerable interest exists in the vast relatively untapped timber resources of this large region.

"The Swedish Gang Sawmill for Rocky Mountain Woods." Larry O'Neil, Forest Products Co., Kalispell, Mont.

"The Use of Rocky Mountain Species for Pulping." H. E. Troxell, School of Forestry & Range Management, Colorado A & M College, Fort Collins, Colo.

"Suitability of Rocky Mountain Woods for Veneer and Plywood." I. V. Anderson, U. S. Forest Service, Missoula, Mont.

"Hardboard Manufacturing Possibilities for the Rocky Mountain Territory." John B. Grantham, Oregon

Forest Products Laboratory, Corvallis, Ore.

"Salvaging Lumber Shorts by End Jointing." Boyd D. Richards, Department of Forestry, Alabama Polytechnic Institute, Auburn, Ala.

Three of the authors, namely, O'Neil, Troxell, and Anderson, were unable to attend the meeting and their papers were read by Mark Lehrbas, C. A. Newport, and L. A. Mueller, respectively.

During the short business session that followed, the following officers were installed for the coming year:

Chairman, R. C. Fraunberger, Atlas Plywood Corp., Gladstone, Mich.

Vice-chairman, L. A. Mueller, 2750 Exeter Driver, Tucson, Ariz.

L. A. MUELLER,
Secretary.

Division of Private Forestry

The Division of Private Forestry met jointly with the Division of Forest Products at the municipal auditorium, Colorado Springs, September 14. The morning session was devoted to private forestry with program chairman E. F. Heacox presiding in the absence of the three Division officers. N. E. Bjorklund was appointed acting secretary. Total attendance at the session was over 110.

W. S. Swingler, U. S. Forest Service, Washington, D. C., read a paper on "The Forest Service and Private Forestry."

W. D. Hagenstein, Industrial Forestry Association, Portland, Ore., and H. D. Bennett, Appalachian Hardwood Manufacturers, Inc., Cincinnati, Ohio, gave papers on "The Evaluation of Forest Management Practices."

Hugh Wilcox, State University of New York, College of Forestry, Syracuse, N. Y., read a paper on "Chemical Debarking."

As the paper, "Industrial Forestry Research," by Clarence Richen, Crown Zellerbach Corporation, Portland, Ore., was delayed and did not arrive in time for presentation, program chairman Heacox outlined the development of forestry research in the Douglas-fir region of Oregon and Washington.

Following the presentation of the technical papers, the following officers were elected:

Chairman, E. Stanley Hurd, Rhinelander, Wis.

Vice chairman, Arthur W. Nelson, Meridian, Miss.

Secretary, Edwin J. Jankowski, Cloquet, Minn.

N. E. BJORKLUND,
Acting Secretary.

Division of Forest Recreation

The meeting of the Division of Forest Recreation was held in the Little Theater, Civic Auditorium, Colorado Springs, on the morning of September 16.

Approximately 100 men were present. The chairman, C. Frank Brockman, College of Forestry, University of Washington, presided. In the absence of Harthon Bill (vice chairman) and Wm. Parke (secretary), James Tyndall served as secretary and chairman of the nominating committee.

Four papers were read, as follows:

"Recreational Activities and Their Coordination with Other Forest Values on the Pike National Forest." Raymond E. Phillips, supervisor of the Pike National Forest, Colorado Springs.

"Recreational Activities—A Potent Public Relations Force in Forestry." Albert Arnst, consulting editor, *Western Conservation Journal*, Seattle.

"Interpretation as a Means of Developing Public Responsibility for the Care of Public Lands." Edwin C. Alberts, park naturalist, Rocky Mountain National Park, Estes Park, Colo.

"Problems of Winter Use on Forest Lands." Felix C. Koziol, supervisor, Wasatch National Forest, Salt Lake City.

A short business meeting was held. The following officers were elected.

Chairman, Harthon L. Bill, Yosemite National Park, Calif.

Vice-chairman, Wm. N. Parke, Snoqualmie National Forest, Seattle, Wash.

Secretary, Donald Duncan, University of Minnesota, St. Paul.

C. FRANK BROCKMAN,
Chairman.

Division of Public Relations

An evening meeting of the Division of Public Relations was held September 14 in the municipal auditorium, Colorado Springs. Chairman Albert Arnst presided. The attendance was 150.

Theme of the meeting was Public Relations Problems Facing the Administrators and Users of Public Lands in the Rocky Mountain Region.

Participants were Joseph N. Hessel, U. S. Forest Service, Denver, who presented the case for the public land administrators; and Willard Simms, editor of *The Record Stockman*, Denver, who summarized viewpoints of the public land users.

A special showing of the film, "The Enemy Is Fire," climaxed the program. The film, produced by Oregon and Washington Forest Fire Associations, showed fire prevention measures used by logging operators in the Douglas-fir region.

New officers elected are:

Chairman, Ralph G. Unger, College of Forestry, Syracuse 10, N. Y.

Vice chairman, Albert Wiesendanger, Keep Oregon Green Association, P. O. Box 471, Salem, Ore.

Secretary, C. W. Mattison, Forest Service, U. S. Department of Agriculture, Washington 25, D. C.

C. W. MATTISON
RALPH UNGER
ALBERT ARNST, *Chairman*

Division of Silviculture

The meeting of the Division of Silviculture was held on the morning and afternoon of September 14 in Colorado Springs municipal auditorium. Chairman Russell K. LeBarron presided. The attendance was 200.

The papers presented in the morning session followed no single theme, having been chosen rather to cover a variety of subjects in the field of silviculture: thinnings in Douglas-fir; a harvest-cutting system for ponderosa pine; the causes of blow-up fires and the possible reduction of the risk of their occurrence through silviculture, problems of use and cultivation of shelterbelts; and the role of natural factors in the control of the Engelmann spruce beetle. Experiences gained throughout the West were related by the different speakers.

A panel disussion of the role of genetics in silviculture was on the afternoon's program. The panel members, in turn, covered the scope of forest genetics; extensive applications of genetics in silviculture; selection; hybridization; and pest control through genetics. The importance of improving the products of the forest and of speeding up their growth through tree improvement was questioned by no one.

A suggestion, presented to the Division during the business meeting following the panel discussion, that a nation-wide committee on forest-tree improvement be set up within the Division, was received with enthusiasm. The action taken on this matter is related later in this report as is the Divi-

sion's resolution concerning an associate editor in the field of forest genetics for the Journal of Forestry.

New officers elected for calendar year 1954 by letter ballot in advance of meeting are:

Vice-Chairman, J. W. Duffield, College of Forestry, University of Washington, Seattle;

Secretary, Henry L. Hansen, School of Forestry, University of Minnesota, St. Paul.

The present vice chairman, Philip A. Briegleb, Central States Forest Experiment Station, Columbus, Ohio, automatically succeeds to the chairmanship.

The Committee on Technical Procedures and Standards, F. H. Eyre, chairman, submitted a written report which was read by the Division secretary. The report stated that of the six tasks originally set up by the Committee, four have been completed and either have been published in the JOURNAL OF FORESTRY or are now awaiting publication. One task has been abandoned.

The sixth task (on stocking) is still being worked on by a subcommittee composed of Bert Lexen, Chairman, Fred G. Wilson, and Henry Bull. The report recommended that the committee be terminated and that the subcommittee on stocking be continued as an independent committee. The recommendation was adopted by the Division.

The Committee on Forest Practices, according to a report by its chairman Kenneth P. Davis, which was read by Stephen Spurr, is progressing on the proposed compilation "A Decade of Development in Forest Practices, 1940 to 1950." The committee was continued by the chairman of the Division.

The report of Chairman John F. Shanklin of the Committee on Natural Areas, read by committee member W. A. Dayton, reflects the continued activity of this committee. A revised listing of approved natural areas is being prepared to replace the present list which is now out of print. Included will be several new areas in continental United States and Alaska.

In view of the rapidly increasing interest in forest genetics and tree breeding, the Division passed a motion that instructed the chairman to appoint a Committee on Forest Tree Improvement "to keep abreast of tree-improvement research and developments, encourage research, promote application of genetic principles in silviculture, summarize information, and encourage publication of articles in the JOURNAL OF FORESTRY." The motion further stated that "the chairman select the committee with the help of members of the Division especially interested in forest genetics."

A motion was passed as follows: "That the Division recommends to the Council that an associate editor of the JOURNAL OF FORESTRY be appointed to handle papers on forest genetics, and papers in those related fields, such as artificial regeneration or silvics, which the Editor and Council think will properly divide the load of the associate editor in the silvicultural field." The proposal to divide the load in the silvicultural field is based, in part, upon the belief that the duties of this position have become too heavy for one man to carry as a contributed service to the Society. The Division's new Tree Improvement Committee will suggest to the Council for their consideration, an appropriate individual for the proposed new associate editor position.

The Chairman announced that affiliation with the Division of Silviculture is open to all classes of members of the Society of American Foresters. Affiliation can be accomplished by notifying the Executive Secretary of the Society in Washington.

JESSE H. BUELL,
Secretary.

Division of Watershed Management

The third meeting of the Division of Watershed Management was held at the Antlers Hotel, Colorado Springs, Colorado on September 16, 1953. This was a joint meeting held with the Division of Range Management with the Division of Watershed Management taking charge in the morning session and the Division of Range Management in the afternoon. The theme of the Divisional meeting, in keeping with that of the general meeting, was "Nature on Edge."

The meeting was called to order by Chairman Harold G. Wilm at 9:15 a.m. There were 60 members and guests in attendance. A short business meeting was held in which Dr. Wilm reported that a nominating committee composed of Joseph Taylor, George Phillips and Walter Schipull (chairman) had been appointed and had nominated the following slate of officers for 1954:

For chairman:

Marvin D. Hoover—Leader, Piedmont Research Center, Union, S. C. (vice-chairman, 1952-1953).

Allen E. Thompson—Forester, City of Seattle, Wash.

For vice-chairman:

Robert E. Dils—Assistant Professor of Forestry (forest influences) Michigan State College, E. Lansing (sec.-treas., 1952-1953).

Bernard Frank—Asistant Chief, Division of Forest Influences, Washington, D. C.

For secretary-treasurer:

James J. Byrne—Assistant Regional Forester (Engineering and Watershed Management), Forest Service, San Francisco, Calif.

Harvey R. Frantz—Forester, Interstate Commission on Delaware River Basin, Bethlehem, Pa.

The following officers were then elected by a mail ballot completed September 7, 1953: Chairman—Marvin D. Hoover, Vice-chairman—Robert E. Dils, and Secretary-treasurer—James J. Byrne.

Wilm asked the members of the Division to encourage and participate in furthering interest in watershed management. Several suggestions were made as to possible Divisional activities including:

1) Review the Divisional charter.

2) Draw up a formal set of by-laws for the Division (concerning membership, election of officers, etc.)

3) Undertake a study or summarize the literature on the effects of timber harvesting on steep mountain land on watershed conditions.

At the request of the Chairman, Bob Dils reported on a Divisional project on educational trends in forest influences and watershed management—a summary of an article which is to appear in the JOURNAL.

The business meeting was closed by the chairman at 9:45 a.m.

Program

Norman R. Tripp presented an interesting article prepared by himself and Donald E. Whelan, both of the Northeastern Forest Experiment Station, Upper Darby, Pennsylvania, entitled "An Evaluation of the Effect of Watershed Treatment on Flood Runoff in the New England - New York River Basin Area." Their 5-point method of forecasting the effect of watershed treament provided the basis for an interesting discussion period following the presentation.

William R. Boggess presented an illustrated discussion of "Soil Moisture Trends under Old Field and For-

est Cover in the Hill Section of Southern Illinois." Boggess' comparison of soil moisture conditions among pine, hardwood and grass cover brought out numerous questions.

"Changes in Streamflow Characteristics Brought About by Cutting Forest Vegetation" were very aptly summarized by Edward A. Johnson of the Coweeta Hydrologic Laboratory, Southeastern Forest Experiment Station (Franklin, N. C.). An interesting comparison of streamflow characteristics resulting from clear-cutting with natural regrowth, clear-cutting with annual recutting, cutting of a heavy understory, and the cutting of riparian vegetation was made.

Percy B. Rowe of the California Forest and Range Experiment Station discussed the results of litter and moisture studies at three stations in California. The title of his paper was "Effects of the Forest Floor on the Disposition of Rainfall in Pine Stands."

The 1953 meeting of the Division of Watershed Management was officially closed by Chairman Wilm at 11:50 a.m.

ROBERT E. DILS
Secretary-Treasurer.

Reports of the meetings and transactions of three Divisions are absent from this issue. They had not been received by the closing date for the November issue (October 1).

Hence, the reports of the Divisions of Education, Range Management, and Forest-Wildlife Management will have to appear in a later issue.

Joint Meeting of Council and Section Delegates

A joint meeting of the Council and Section delegates was held on the evening of September 13 in the municipal auditorium, Colorado Springs. Dr. Frank H. Kaufert presided.

This meeting was primarily for the purpose of discussing, within the official S.A.F. family, the costs of operating the Society in relation to general income and the current dues structure. E. L. Demmon led the discussion, and reviewed figures to show how the cost of Society operation had risen in recent years. The financial matters reviewed were published in the JOURNAL OF FORESTRY for July, pages 518-520.

Several Section delegates reported on opinion polls taken among their membership that the sentiment is generally against an increase in dues, especially for the Member grade which is now $5 annually. Mr. Demmon announced that the Council is not now proposing an increase in dues; that the discussion was for the information of the Section officers.

Dr. Kaufert reviewed membership following the revised procedures set up in 1952 as a result of amendment of the Constitution and Bylaws. His report will be found elsewhere in this issue under "Report of the Council Committee on Membership."

Dr. Kaufert urged that the Sections develop and make more use of the grade of Associate Member of the Section. He said that many applications for Associate Member of the Society are of questionable eligibility, and some are rejected for lack of qualifications. Although not qualified for Associate Membership in the national Society, many such applicants are well qualified to be Associates of the Sections.

Mr. Clepper and Miss Warren discussed the 1953-1954 membership campaign as approved by the Council, and urged the support and cooperation of the Sections. Several Section delegates expressed the opinion that the proposed membership quotas were too high. Further information on the membership campaign will appear in subsequent issues of the JOURNAL.

In addition to the Council, the following Section delegates were officially represented.

Allegheny, Adna R. Bond.
Appalachian, C. F. Korstian.
Central Rocky Mountain, J. Roeser, Jr.
Central States, Rudolph H. Grabow.
Columbia River, Thomas J. Orr.
Gulf States, William McD. Palmer.
Inland Empire, Philip C. Johnson.
Intermountain, Lincoln Ellison.
Kentucky-Tennessee, John W. Lehman.
New England, Edwin L. Giddings.
New York, A. B. Recknagel.
Northern California, George A. Craig.
Northern Rocky Mountain, W. C. Hodge.
Ozark, Peter W. Fletcher.
Puget Sound, Gilbert Liming.
Southeastern, Archie E. Patterson.
Southwestern, R. E. Rea.
Southern California, Russell A. Ireland.
Upper Mississippi Valley, A. E. Schneider.
Washington, Vance Tribbett.
Wisconsin-Upper Michigan, Allan S. Haukom.

Report of Council Meeting

A meeting of the Council was held September 13, 1953 in the Antlers Hotel, Colorado Springs, Colo.

Present were President Geo. L. Drake, Vice President E. L. Demmon, W. J. Brown, D. B. Demeritt, F. H. Kaufert, C. Otto Lindh, G. D. Marckworth, R. E. McArdle, Earl Porter, P. A. Thompson, and Henry Clepper, executive secretary. R. H. Westveld was unavoidably absent because of illness. Also present were A. B. Meyer, editor, and Miss L. A. Warren, business manager.

Membership Actions

The Council voted unanimously to elect to Honorary Membership Florencio Tamesis, director of the Bureau of Forestry of the Philippines; dean of the College of Forestry, University of the Philippines; and chairman, Division of Agriculture and Forestry, National Research Council of the Philippines. Mr. Tamesis received his B.S.F. and M.S.F. degrees from the University of Washington. His nomination for Honorary Membership had the endorsement of the Society's Committee on International Relations.

On the recommendation of the Gulf States Section, the Council approved the temporary remission of dues, because of illness, for William C. Hopkins of Mississippi.

In the case of an applicant for Junior Membership and an applicant for Affiliate Membership, the Council voted to table the applications pending receipt of further information from the Sections concerned.

A proposed membership campaign for 1954 with a goal of 1000 new members was presented to the Council by Miss Warren and Mr. Clepper, and approved.

Annual Meeting in 1955

Under the Society's system of scheduling meetings by rotation among regions of the United States, the West Coast region is due for the 1955 meeting. All four West Coast Sections were invited to submit their suggestions as to place and dates.

HOW ADVANCED DESIGN

Makes Allis-Chalmers Tractors more dependable

These heavy-duty tractors have toughness and ease of servicing to match their outstanding performance ability. Here are some of the advanced design features that provide extra strength and protection — keep Allis-Chalmers tractors on the job more hours:

1. One-Piece, All-Welded Structural Main Frame . . . strong and firm without a single ounce of excess weight — absorbs all vertical and horizontal stresses.

2. Extra Large Idler and Sprocket eliminates rocking action, puts more track on the ground for greater stability and better traction.

3. Spring-Loaded, Positive Seal keeps dirt, moisture and grime from damaging truck wheels, idlers and support rollers . . . you lubricate them only once every 1,000 hours.

4. All-Steel, Welded A-Frame Track Stabilizer permits free track oscillation, yet keeps tracks rigidly in line and absorbs thrusts and twists from shock loads and working on uneven terrain.

5. Oil Enclosed Track Release Mechanism reduces track maintenance and breakage. An adjustable screw lock provides positive holding action that maintains adjustment at required setting.

6. Engine Not Used as Structural Member — no strain is transmitted to it. Engine weighs less per horsepower developed, because of 2-cycle design — has modern unit injection.

UNIT CONSTRUCTION SAVES SERVICE TIME

With Allis-Chalmers *unit construction*, major assemblies are easily removed without disturbing related assemblies. This brings real savings in time and money, puts tractors back to work faster. It assures better inspection and maintenance, too. Servicemen find it easy to remove major parts to correct trouble before damage develops.

Let your dealer tell you more about the toughness of Allis-Chalmers tractors, their time-saving unit construction — and their unequalled lugability and work power.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

SAVE! BURN WOOD

RITEWAY
HEATERS—FURNACES
BOILERS

Enthusiastic owners report RITEWAY's exclusive complete combustion principle saves up to half the fuel. Large fuel magazine and thermostat hold even temperature for 24 hours.

Thoroughly tested and approved. Burns any kind of wood — or coal. Check below for further information.

☐ HEATERS ☐ BOILERS
☐ FURNACES

RITEWAY MFG. CO.
P.O. Box 61 Harrisonburg, Va.

Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously, the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.

Forestry graduates in management, under 30 years of age, as staff assistants to district foresters.

Write Director, Texas Forest Service, College Station, Texas.

Positions Wanted

Forester, B.S. New Hampshire 1948, M.F. Yale 1949, desires job in forest management, personnel work, or sales, in northeast, preferably New Hampshire. 29, married, three children, navy officer, three years' experience in New England, cruising, buying, general sawmill work. Desire to start January 1st upon release from active duty.
Box Q, Journal of Forestry, Mills Building, Washington 6, D. C.

Graduate North Carolina State College, forest management, desires consulting or woods supervision work in North Carolina, preferably near Raleigh. Three and a half years experience in coastal North and South Carolina, including cruising and forest management.
Box N, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, age 50, married, seeks position as woods manager. B.S.F. University of Maine, 1926. 12 years government service; 13 years industry. Long lumber and pulpwood operations. Available for interview.
Box O, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, 27, veteran, B.S.F. University of Montana, desires change for opportunity to advance. Experience includes fire control, forest management, timber marketing, reforestation, and public relations with National Park Service and state forestry agency. Employed as district forester.
Box P, Journal of Forestry, Mills Building, Washington 6, D. C.

Meetings have been held on the West Coast as follows:

October 1949	Seattle
November 1939	San Francisco
December 1936	Portland
December 1932	San Francisco
December 1927	San Francisco

Invitations were presented to the Council from the Columbia River Section to hold the 1955 annual meeting in Portland, Ore. and from the Northern California and Southern California Sections to hold the meeting in California.

As the Puget Sound Section was host for the latest meeting (Seattle, 1949) the officers of that Section took the attitude that the two California and the Columbia River Sections should have first choice.

Taking into consideration that California has had three meetings, one more recently than Oregon, which has had but one, the Council voted (P. A. Thompson dissenting) to schedule the 1955 meeting in Portland, Ore. during the week of October 17.

New Associate Editor

In response to a recommendation from the Division of Silviculture (reported in full elsewhere in this issue), the Council voted unanimously to authorize an associate editor for the JOURNAL OF FORESTRY for "forest tree genetics, nursery practice, and planting."

The new Committee on Tree Improvement of the Division of Silviculture has offered to suggest an appropriately qualified person for the office. When he has been appointed, an early announcement will be made in the JOURNAL.

Employees' Retirement Plan

The Council approved a retirement plan for Society employees as proposed by a special committee appointed to study the matter—Miss L. A. Warren, Sam R. Broadbent, and Geo. L. Drake.

The purpose of the plan is to provide a life income, after retirement, of each qualified employee, and to make provision for his dependents in case of his death. The plan applies to all qualified employees other than the executive secretary, editor, and business manager, who are already covered under a previously instituted retirement system.

Each participating employee will contribute half the cost; the Society will contribute half. The plan is not compulsory.

Retirement Fund

Miss Warren reported as follows:

"At its May meeting the Council authorized an additional $1,500 annually to be added to the costs of providing a retirement fund for qualified employees. Only $450 of the $750 (allocated for the 1953 half year) will be used. Accordingly, a retirement fund reserve of $300 is being established with the balance. To this reserve will be added in 1954 the difference between $1,500 and the acual cost of premiums and/or bonds. This reserve fund will be used to purchase government bonds earmarked 'Retirement Fund Reserve,' which will be redeemed as needed to pay the Society's portion of annuities for participating employees. In short, the difference between the $1,500 appropriated annually will appear as an expense in the current budget as an allocation to the Retirement Fund Reserve."

The Council unanimously voted that the retirement fund shall be built up by means of a reserve which will be the difference between the actual cost and the $1,500 authorized by the Council in May 1953, and shall continue in effect until further action by the Council.

Education Study

At a meeting of the Council of Forestry School Executives, held in Colorado Springs on September 12, this Council formally requested the Council of the Society to sponsor a study of forestry education as a parallel study to that of forestry research now being conducted by the Society under a grant from the Rockefeller Foundation.

The Council unanimously approved the proposal and authorized the president to appoint a committee to explore possibilities. Subsequently, Hardy L. Shirley and Henry Clepper were asked to comprise the committee.

Miscellaneous

Mr. Drake announced that this would be the last meeting of the present Council, as the term of office expires December 31. He thanked the members for their services to the Society.

New York Section Summer Meeting

Foresters from New York, New England and Canada began gathering for the annual summer conclave at

Long Lake on the afternoon of Wednesday, September 9th. A business meeting at Long Lake's modern town hall under the guidance of Chairman Fred Winch constituted the main activity for the evening. Following the secretary's and treasurer's report, a general discussion centered around our old friend, "Management Policy for Forest Preserve Lands." Contrary to custom, no report was given in the absence of the Policy and Legislation Committee. Svend Heiberg, chairman of the Program Committee, outlined the program for the following day's trip.

On Thursday morning at Huntington Forest near Newcomb, Mr. Heiberg conducted about half of those present on a trip in a 40 year old white pine plantation. He led the discussion explaining the intricacies of economic growing of white pine. Also on the Huntington Forest, several girdling tools were demonstrated and chemical application tanks and brushes were shown to demonstrate methods of killing trees for control of species or for chemi-peeled pulpwood.

Leaving the Huntington Forest, the trip was made to the Pack Forest at Warrensburg in time for luncheon. Dividing into 4 groups, a full afternoon was spent visiting several areas of the forest where activities relating to chemical control of hardwood overtopping white pine; pine regeneration under high shelterwood of pine and favorable effect on control of weevil; effects of potash deficiency in soils on spruce and pine; effect of close spacing on quality of stem and limb size and factors involved in high pruning and its use in producing high quality logs were explained by C. H. Foster, Svend Heiberg, Donald White, John Barrett, and Duncan Harkin.

A banquet was served at the Colonial Arms in the evening. A diversified array of door prizes was awarded. Following the introduction of guests and a welcome extended to all by Chairman Fred Winch, Esmond Sears, acting as moderator, introduced the panel consisting of Fred Winch, A. W. Bratton, Stanley Mesavage, and William Duerr who in turn spoke on the topic "More Silviculture in the Woods" as it applied to each of their fields of endeavor.

Friday morning was devoted to three specialized trips, (1) more white pine silviculture on Pack Forest, (2) study of soil conditions and related factors on Pack Forest, and (3) wildlife management on Huntington Forest.

Membership Applications and Advancements

Proposals for admission, advancement, and reinstatement received in the Society office during the month of September are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of December 1, 1953. Communications from voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Student Grade

WEST VIRGINIA UNIVERSITY

Gissy, J. A. White, E. C.
Stanley, W. C. White, J. B.

NEW - REVOLUTIONARY for marking trees!
a GUN that cleans itself
a CAN that screws on the gun
a PAINT you don't have to stir
3 SAVINGS IN ONE
Save hours of tedious stirring, thinning, straining paint! Eliminate messy funnels, canteens, gun cans! End the chore of cleaning guns every night!
Working with professional foresters, Nelson's chemist-engineers have developed the first paint, the first container, the first gun designed especially for marking trees.
The new Nelson Tree Marking Paint does not settle, thicken, or skin over—can be used direct from the can with no mixing. It is durable, not absorbed into wood or bark, retains high visibility—offers every property foresters have long wanted . . . (every color, too—yellow, white, orange, blue, red).
Packed in disposable, easy-to-carry quarts, the paint can screws directly onto the special new NEL-SPOT Tree Marking Gun. You just throw away used up cans, and save time, paint, equipment now wasted in extra handling.
The NEL-SPOT gun has a reversible tip in the nozzle to blow out dirt, a cap to prevent paint drying in the gun, a cleaning wire set in the cap to keep the orifice open.
For details on this revolutionary, time-mess-and-money-saving combination, WRITE: Dept. JF-6
Nelson
TREE MARKING PAINT
YELLOW
THE NELSON COMPANY
1234 Prospect Avenue
Iron Mountain, Michigan

Junior Grade

Leonardi, S. A., 312 Fairfax St., Berkeley Springs, W. Va.; Univ. of Ga., B.S.F., 1953. (Student, 1952).

Walker, J. W., Photogrammetric Engr., Michael Baker, Inc., Rochester, Pa.; Univ. of Mo., B.S.F., 1950.

Appalachian Section

Junior Grade

Rodihan, W. F., 1315 Highmarket St., Georgetown, S. C.; State Univ. of N. Y., B.S.F., 1953. (Student, 1951).

Welch, M. E., 1809 Park Drive, Raleigh, N. C.; N. C. State College, B.S.F., 1953.

Member Grade

Dillingham, M. M., Forester, Champion Paper and Fibre Co., Canton, N. C.; N. C. State College, B.S.F., 1938. (Junior, 1946).

Weddelich, A. O., Supt., Log Cabin Assn., Sylva, N. C. (Aff. 39J45).

Affiliate Grade

Boyce, R. M., Cons. Forester, Fairfield Forest Products Co., Newberry, S. C.; V.P.I., B.S., (Forestry), 1953.

Butler, B. H., Woods Supv., West Virginia Pulp and Paper Co., Summerville, S. C.

Central Rocky Mountain Section

Junior Grade

Cross, L. M., Granby, Colo.; Colo. A. & M., B.S.F., 1953. (Student, 1953).

Hartman, W. L., Forester, U.S.F.S., Gunnison, Colo.; State Univ. of New York, B.S.F., 1952.

Wadlow, G. D., Forester, U.S.F.S., Gunnison, Colo.; Colo. A. & M., B.S.F., 1949.

Member Grade

Folkestad, J. O., Forester, U.S.F.S., Glenwood Springs, Colo.; Univ. of Minn., B.S.F., 1939. Reinstatement.

Fortenberry, E. J., Forest Supv., U.S.F.S., Laramie, Wyo.; L.S.U., B.S.F., 1931. Reinstatement.

Central States Section

Junior Grade

Schepers, B. E., Line Clearing Supv., Consumers Power Co., Jackson, Mich.; Mich. State, B.S.F., 1949.

Columbia River Section

Junior Grade

Berry, D. W., Research Director, Oregon State Forestry Dept., Salem, Ore.; Ore. State College, B.S.F., 1941. Reinstatement.

Madsen, R. S., Asst. Dist. Warden, Oregon State Board of Forestry, Kinzua, Ore.; Ore. State College, B.S.F., 1950.

Thomson, A. P., Forester, Bur. of Land Mgmt., Roseburg, Ore.; Utah State Agric. College, B.S.F., 1952.

Affiliate Grade

Pugsley, L. M., Forester, Crown Zellerbach Corp., Vernonia, Ore.; Wash. State College, B.S., (Forestry), 1949.

Associate Grade

Chickering, H. G., Pres., Consulting Photogrammetrial Inc., Eugene, Ore.

Intermountain Section

Junior Grade

Tocher, S. R., Asst. Prof., Forest Utilization, Utah State Agric. College, Logan, Utah; Univ. of Calif., B.S.F., 1949; M.F., 1950.

Kentucky-Tennessee Section

Junior Grade

Bowers, J. L., 407 Watauga Ave., Elizabethton, Tenn.; Univ. of Ga., B.S.F., 1953. (Student, 1952).

New England Section

Junior Grade

Billings, J. L., Windsor County Forester, Woodstock, Vt.; Univ. of Mass., B.S.F., 1950.

Gilbert, A. M., Research Forester, N. E. Forest Exp. Sta., Laconia, N. H.; Univ. of Mich., B.S.F., 1943. Reinstatement.

Godson, L. W., Forester, Hollingsworth and Whitney Co., Greenville, Me.; Univ. of Me., B.S.F., 1947. Reinstatement.

Affiliate Grade

Ashe, W. C., Appraiser, Fish and Wildlife Service, Derby, Conn.; Univ. of Conn., B.S., (Forestry), 1953.

Northern California Section

Junior Grade

Johnston, D. J., Cons. Aide, Robert MacDougall, Ukiah, Calif.; Oregon State College, B.S.F., 1952.

Affiliate Grade

Stahl, V. E., Asst. Forest Rgr., Calif. Div. of Forestry, Sutter Creek, Calif.

Ozark Section

Junior Grade

Fox, W. H., General Partner, W. S. Fox & Sons, Pine Bluff, Ark.; Univ. of Ark., B.S., (General Business), 1942. (Aff., 1947).

Moyle, R. C., Forester, U.S.F.S., Crossett, Ark.; Pa. State, B.S.F., 1950.

Puget Sound Section

Junior Grade

Barr, K. J., 3315 Hunter Blvd., Seattle 44, Wash.; Univ. of Wash., B.S.F., 1953. (Student, 1952).

Harrison, R. P., General Del., Juneau, Alaska; Univ. of Wash., B.S.F., 1953. (Student, 1952).

Victor, A. B., 8815 17th S.W., Seattle, Wash.; Univ. of Wash., B.S.F., 1953. (Student, 1952).

Member Grade

Powell, R. D., Forester and Land Surveyor, Montesano, Wash.; Univ. of Wash., B.S.F., 1948. (Junior, 1948).

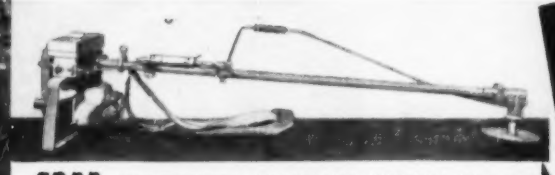
ONE MAN DOES THE WORK OF 6

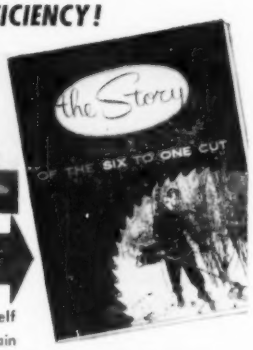
WITH THIS REMARKABLE

POWER-DRIVEN BRUSHCUTTER

BRUSHMASTER®

REDUCES COSTS! . . . INCREASES EFFICIENCY!





FREE BOOKLET SHOWS HOW TO REDUCE BRUSH CLEARANCE COSTS!

Brushmaster is the talk of the industry . . . and is now proving itself in the field with many and varied companies which must maintain right-of-way clearance. Cuts all brush, from matted grass to saplings 4" in diameter. Operator completely protected, cannot come in contact with blade. One man operated, lightweight, it goes anywhere . . . reaching overhanging branches and vines . . . and cropping close to the ground! Vibration-free, clutch controlled, positive drive. Send for booklet today!

BRUSHMASTER SAW, INC.
840 EMERALD ST., KEENE, N. H.

Subsidiary of Harrington & Richardson, Inc., established 1871.
Manufactured and sold in Canada by H&R Arms Co., Ltd. Montreal, Canada

Savage, M. B., Forester, Rayonier, Inc., Hoquiah, Wash.; Univ. of Wash., B.S.F., 1946. (Junior, 1946).
Steinbrenner, E. C., Forest Soils Spec., Weyerhaeuser Tbr. Co., Centralia, Wash.; Univ. of Minn., B.S.F., 1949; Univ. of Wis., M.S., (Soils), 1951. (Junior, 1950).

Affiliate Grade

Sutherland, C. D., Grad. Stud., Dept of Forestry, Washington State College, Pullman, Wash.; Wash. State College, B.S., (Forestry), 1953.

Southeastern Section

Junior Grade

Bays, W. A., Forester, Hudson Pulp and Paper Corp., Shamrock, Fla.; Univ. of Fla., B.S.F., 1949.
Richey, J. W., Univ. of Ga., Athens, Ga.; Univ. of Ga., B.S.F., 1953. (Student, 1953).
Turner, W. Q., 375 Holman Ave., Athens, Ga.; Univ. of Ga., B.S.F., 1953. (Student, 1953).
Vickery, W. W., Box 106, Haleyville, Ala.; A.P.I., B.S.F., 1953. (Student, 1953).

Member Grade

Margolis, R., Forester, McClellan Reservation, Anniston, Ala.; Duke Univ., B.A., 1929; Yale, M.F., 1931. (Junior, 35R45R53).

Southwestern Section

Junior Grade

Andrews, S. R., Asst. and Assoc. Path., Div. of Forest Path., U.S.D.A., Albuquerque, N. Mex.; Yale Univ., B.S., 1933; M.F., 1935; Univ. of Minn., Ph.D., (Plant Path.), 1953. Reinstatement.
Foreman, B. L., Lbr. Stud., Southwest Lbr. Mills Inc., McNary, Ariz.; Univ. of Wyo. B. S., (Botany), 1948; Mont. State, B.S.F., 1949; M.F., 1950.

Member Grade

Charles, P., Asst. Forest Supv., U.S.F.S., Phoenix, Ariz. (Junior, 44R48).

Upper Mississippi Valley Section

Student Grade

IOWA STATE COLLEGE

Torrence, J. F. Wilhite, L. P.

Affiliate Grade

Lee, H. A., Dist. Rgr., Minn. Forest Service, Cass Lake, Minn.
Nelson, E. H., Pulpwood Buyer, Northwest Paper Co., Cloquet, Minn.

Washington Section

Junior Grade

Rosapepe, J. V., Lt. Cdr., Supply Corps, U.S.N., Washington, D. C.; Univ. of Mich., B.S.F., 1940. Reinstatement.

Wisconsin-Upper Michigan Section

Affiliate Grade

Heinz, J. R., Company Forester, Tigerton Lbr. Co., Tigerton, Wis.; Univ of Wash., B.S., (Forest Products), 1951.

The Register of Scientific and Technical Personnel

During the next several weeks professional foresters will be asked to complete a questionnaire for the National Scientific Register.

The questionnaire consists of about 25 questions concerned primarily with determining the registrant's skills and scientific specialties, his present position, his language proficiency, and his professional training.

Congress has directed that a National Scientific Register be prepared and maintained. The purposes of the questionnaire are:

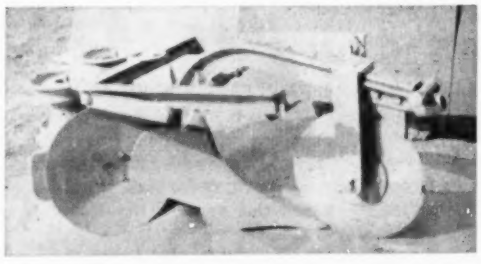
1. To provide information for effective utilization of manpower in case of national emergency.

2. To provide data for statistical studies on scientific manpower.

The National Science Foundation is the agency charged with responsibility for preparing the Register. Several organizations are cooperating with NSF under a series of grants. The collection and preparation of data for professional foresters is being handled by the American Institute of Biological Science.

Other than for the purposes listed above, the Society of American Foresters may make use of Register data in any way its officers may choose. The complete Register will be decentralized and all information concerning foresters will be kept in the AIBS office.

All Society members are urged to fill in the questionnaire when received and return it promptly.



STOP THAT FIRE

RANGER PAL JR. FIRE PLOW

The Ranger Pal Junior fire plow is a hand or hydraulic lift middle buster with coulter and discs. Drawbar connection built of 1" cast steel T-beam. Has 16" coulter roller bearing assembly with grease seal, mounted ahead of 11" tempered steel middle buster, capable of cutting large underground roots. One 16" harrow disc bearing assembly is mounted on each side and slightly behind the middle buster wing which turns the sod over and out. Depth of plowed line may be adjusted by either the presence or absence of two spool weights attached on rear of plow. Leaves a 5 foot earth line and can be drawn by any piece of light equipment, Ford type tractor, jeep or power wagon. Built compact and sturdy for ease in handling and reduced maintenance costs. Tested and proven by Louisiana Forestry Commission. Made by makers of Ranger Pal Fire Plow. Not designed to supersede the Ranger Pal but adapted for lighter equipment. Mass production price at $385.00 each, f.o.b. shop. Workmanship guaranteed.

Ranger Pal Fire Plow production price at $495.00 each f.o.b. shop. Write for further details on both plows.

TWIN CITY WELDING & MACHINE SHOP

301 Jonesboro Highway

WEST MONROE LOUISIANA

MUSSER TREES are GROWING IN ALL 48 STATES!

20 Million TREES a year!

Each year MUSSER teams plant over 20 million more trees, which will soon become:

Seedlings for Forest and Christmas Tree plantings; Transplants for Conservationists, Timber Operators, and Farmers.

MUSSER Customers KNOW their trees have the RIGHT START. We offer world's largest tree selection of Quality plus Volume. You profit from economies of our huge volume. Note our low quantity prices at right:

SPECIAL SCOTCH PINE
2 yr. seedlings 4-8"
$35. per 1000

NORWAY SPRUCE
(MUSSER Special)
2 yr. seedlings 5-10"
$35. per 1000

WHITE PINE
2 yr. seedlings 2-6"
$20. per 1000

DOUGLAS FIR
3 yr. seedlings 6-12"
$45. per 1000

Also shade and hardwood seedlings. Write today for Christmas Tree Growers' Guide and complete wholesale stock list; or tell us your requirements.

MUSSER FORESTS, INC.

Box 26-K INDIANA, PA.

The CRANCO TORCH—

Designed for those who use prescribed fire in woodland management.

Bohl Brothers, *Distributors* jn
1000 Pennington Rd., Trenton 8, N. J.
Please send information on RxB Model CRANCO Torch

Name _____

Address _____

City _____

Forestry News

DeWitt Nelson

DeWitt Nelson Appointed Calif. Resources Director

Governor Earl Warren of California announced the retirement, effective September 8, of Brigadier General Warren T. Hannum, director of natural resources for nearly ten years, and the appointment of DeWitt Nelson as General Hannum's successor. Mr. Nelson has served as state forester since 1945, and prior to that for a short time was deputy director of the Department of Natural Resources.

A forestry graduate of Iowa State College, Mr. Nelson joined the U. S. Forest Service in California in 1925 and has been a resident of the state ever since. During his Forest Service career he served as supervisor of four national forests in California—Trinity, Shasta, San Bernardino, and Tahoe. During 1935 and 1936 he was assigned to the Civilian Conservation Corps as liaison officer between all technical services and the Army for the Ninth Corps Area which included all western states.

In 1944 he resigned as supervisor of the San Bernardino National Forest to become deputy director of the State Department of Natural Resources, and the following year was appointed state forester. He was President of the Association of State Foresters in 1951, was a member of the Council of the Society of American Foresters from 1948 to 1951, and recently served as chairman of the Society's Division of Forest Management.

Randolph G. Pack Honored

Randolph G. Pack, Honorary Member of the Society of American Foresters, was awarded the honorary degree of Doctor of Science by the University of Michigan on October 2, 1953, in recognition of his activities in forest conservation and rational land management.

Given on the 50th anniversary of forestry teaching at the University, the degree reads: "Industrialist, apostle of conservation. In no measure have the varied and pressing obligations of a successful business career dulled in him the concern for our forests that is characteristic of his family. Constant application to the problems of conservation and active participation in regional and national movements have led him to a considered philosophy of rational land management and have made his voice one which is heeded in counsel. As president of the forestry foundation which bears the honored name of his father, he has initiated programs of research in which this university has been privileged to participate. We join with all friends of the land in recognizing the merit of one who does not take lightly the responsibilities of citizenship and has served well the common interest and the public good."

Dr. Pack, as president of the Charles Lathrop Pack Forestry Foundation, has initiated a number of important research studies over the past 15 years, including several dealing with methods of forest management on both large and small timber properties. He has

Randolph G. Pack

also been concerned with land use problems, and with public appreciation of forestry, especially in the South. He took an active part in the study of state forestry administration carried on jointly by the Foundation and the Society of American Foresters in 1944-47.

Honorary Doctor of Science degrees were also awarded on the same date to Seth Gordon and to Richard E. McArdle, while Dean Emeritus Samuel T. Dana received a Doctor of Laws degree.

Details regarding these citations, and further information regarding the school's 50-year anniversary celebration were not available on the date on which this issue of the JOURNAL went to press.

Smokey Bear to Be Aided by Junior Rangers

By next year's vacation season Smokey Bear will be aided by a corps of Junior Forest Rangers, according to a recent U. S. Forest Service announcement. Enrollment of these volunteer helpers is expected to reach a high peak at Christmas time when Santa Claus delivers his first batch of Smokey Bear uniforms, toys, and games.

The new twist is part of the nationwide Cooperative Forest Fire Prevention Campaign which is conducted jointly by state foresters and the Forest Service in cooperation with forest industries and many civic and educational groups. This campaign has been sponsored for over 10 years as a public service program of the Advertising Council representing American business and industry.

Associated with the campaign since its early days and now a nationally known symbol of forest fire prevention is Smokey Bear.

Smokey is a favorite of the kids who admire his forest ranger's hat, blue jeans, belt buckle, and general teddy bear likability. As a result they heed his advice, admonish their parents in fire prevention matters, and yearn to dress like Smokey.

Public Law 359 of the 82nd Congress, known as the Smokey Bear Act, protects Smokey from unauthorized use, and provides for licensing of the Smokey Bear symbol. All items must

Instant communications coordinates operations of men and machines... assures vastly improved fire protection

Motorola 2-way Radio pays for itself many times over. Instant contact coordinates work of mobile crews . . . keeps supplies rolling . . . flashes fire danger ratings to men in remote areas. Centralized control gets logs out faster . . . eliminates lost time and mileage.

Eight exclusive Motorola improvements guarantee precision selectivity, time-tested durability. The "Permakay" wave filter eliminates 15 nuisance tuning adjustments *forever!* Let a Motorola engineer in your vicinity give you the complete 2-way Radio story.

Write to Dept. 2286-JF for Details

national **Motorola** RADIO COMMUNICATIONS service

Motorola Communications & Electronics, Inc.
A SUBSIDIARY OF MOTOROLA, INC.
900 N. Kilbourn Ave., Chicago 51, Illinois • Rogers Majestic Electronics Ltd., Toronto, Canada

Major timber companies use Motorola 2-way Radio to keep trucks rolling along bad roads in rugged terrain. Driver receives orders and road information from dispatcher at central console.

Powerful Motorola Pack Unit—a heavy-duty portable radiophone that's ideal for extended trips to distant areas. Operates on its own battery. Or on 117 volt A.C., or storage battery, when used with special plug-in Motorola Power Supply Unit (at left).

The trend is to MORE MOTOROLA 2-way RADIO

WHEN ANSWERING THIS ADVERTISEMENT, PLEASE MENTION "ITEM 5371"

The American Forestry Series

HENRY J. VAUX
Consulting Editor

ALLEN · An Introduction to American Forestry
BAKER · Principles of Silviculture
BOYCE · Forest Pathology
BROWN, PANSHIN, AND FORSAITH · Textbook of Wood Technology
Volume I—Structure, Identification, Defects, and Uses of the Commercial Woods of the United States
Volume II — The Physical Mechanical, and Chemical Properties of the Commercial Woods of the United States
BRUCE AND SCHUMACHER · Forest Mensuration
CHAPMAN AND MEYER · Forest Mensuration
Forest Valuation
CLAWSON · The Western Range Livestock Industry
DAVIS · American Forest Management
DOANE, VAN DYKE, CHAMBERLIN, AND BURKE · Forest Insects
GRAHAM · Forest Entomology
GREELEY · Forest Policy
GUISE · The Management of Farm Woodlands
HARLOW AND HARRAR · Textbook of Dendrology
HUNT AND GARRATT · Wood Preservation
KITTREDGE · Forest Influences
MARQUIS · Economics of Private Forestry
MATTHEWS · Cost Control in the Logging Industry
Management of American Forests
PANSHIN, HARRAR, BAKER, AND PROCTOR · Forest Products
PRESTON · Farm Wood Crops
SHIRLEY · Forestry and Its Career Opportunities
STODDART AND SMITH · Range Management
TRIPPENSEE · Wildlife Management—Volume I, Upland Game and General Principles
Wildlife Management—Volume II, Furbearers, Waterfowl and Fish
WACKERMAN · Harvesting Timber Crops

•

Walter Mulford was Consulting Editor of this series from its inception in 1931 until January 1, 1952.

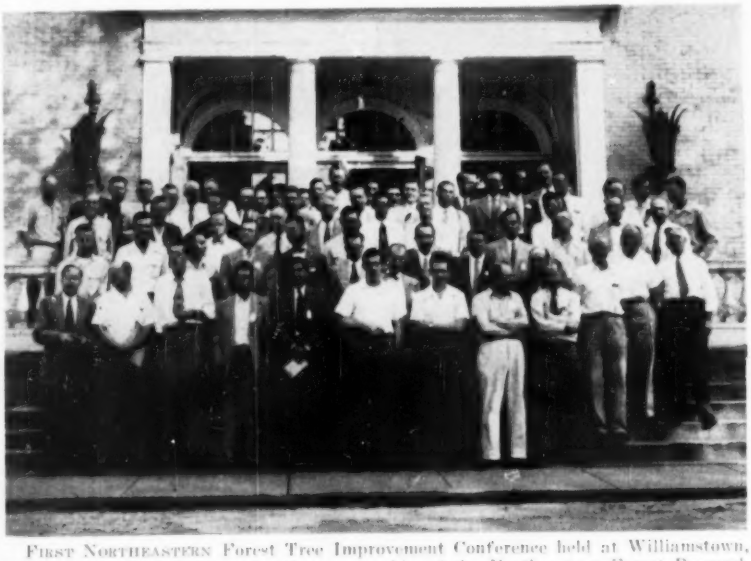
Send for copies on approval

McGRAW-HILL BOOK CO. Inc.
330 West 42nd Street
New York 36, N. Y.

be educational in nature or carry a permanent message on forest fire prevention.

All licensed firms are required to pay a percentage of their profits to the government. These funds must be used to further the forest fire prevention educational program.

Many of the Smokey commercial items include cards which the youngsters can mail to Smokey Bear headquarters in Washington to receive Junior Forest Ranger membership certificates. Responsibilities include "respectfully reminding your parents to be careful with matches and smokes in order to prevent forest fires."-Forest Service officials emphasize that purchase of Smokey items is not necessary to join Smokey's Rangers. Any youngster may enroll by simply writing to Smokey at Washington or to any state forester.



FIRST NORTHEASTERN Forest Tree Improvement Conference held at Williamstown, Mass., Aug. 25-26, 1953, under the sponsorship of the Northeastern Forest Research Advisory Council.

Northeastern Forest Tree Improvement Conference

Under the sponsorship of the Northeastern Forest Research Advisory Council, a conference on forest tree improvement was held at Williamstown, Mass., Aug. 25 and 26. Seventy foresters and related specialists attended.

The subject matter of the conference was divided into four parts: improvement objectives; improvement through the selection of wild types; improvement through breeding and hybridization; and need and opportunities for closer coordination.

Among the speakers on the objectives of tree improvement were Ralph W. Marquis, director of the Northeastern Forest Experiment Station; William P. House, consulting forester, Chesham, N. H.; William C. Bramble, State College, Pa.; and C. H. Foster, Warrensburg, N. Y.

Discussion of tree improvement through selection of wild types was led by Henry I. Baldwin, Concord, N. H.; J. W. Wright, Upper Darby, Pa.; John R. Hansbrough and R. C. Brown of New Haven, Conn.; E. W. Littlefield, Albany, N. Y.; William L. Doran, Amherst, Mass.; and Hans Nienstaedt, New Haven, Conn.

The subject of tree improvement through breeding and hybridization was discussed by Ernst J. Schreiner, Upper Darby, Pa.; Scott S. Pauley, Petersham, Mass.; Jesse Diller, Beltsville, Md.; and A. G. Johnson, Jamaica Plain, Mass.

In order to affect a permanent organization to provide close co-ordination between research workers and others, the conferees voted unanimously to appoint an organizing committee consisting of E. J. Schreiner, chairman, Hans Nienstaedt, and Scott Pauley.

By vote of the conference the JOURNAL OF FORESTRY was requested to devote an entire issue in 1954 to a symposium on forest tree genetics and breeding. Moreover, the Council of the Society of American Foresters was requested to authorize an associate editor for the JOURNAL to handle articles on forest genetics, nursery practice, and tree planting.

2,4,5-T
Acid & Esters

BUILDING MORE FOREST ON LESS FUNDS

Save timber . . . save manpower . . . save money. That's what happens when you use 2,4,5-T to control and clear out brush and undesirable trees.

2,4,5-T keeps many young trees and seedlings free from choking undergrowth. It is ideal for clearing land in preparation for new plantings.

It clears forest roads and paths of creeping vines and fast-growing unwanted trees. Tests on maintaining clear passages show a cost of about $28 a mile with 2,4,5-T—compared with $200 a mile by old fashioned hand methods.

Look into the conservation and economy of this fast, efficient chemical method for killing brush and weed trees. Your dealer will be glad to tell you about brush-killing formulations of 2,4,5-T. Or we'll be glad to send you additional information, on request.

ETHYL CORPORATION
Chemicals for industry & agriculture
100 PARK AVENUE, NEW YORK 17, N.Y.

ETHYL
CHEMICALS
ETHYL CORPORATION

Consulting Foresters

Professional Services Offered by
Members of the Society of American Foresters

Consultant Manager for Operating Firms

Hardwood Bottomlands and MISSISSIPPI DELTA

SOUTHERN PINES —GULF STATES

KEITH CRANSTON, *Forestry Consultant*

Leland, Mississippi
(Headquarters)

Commercial Cruising Services
Woodland Managers • Timber Estimators
Forest Inventories • Growth Studies
Reconnaissance • Appraisals

PROVIDING A SOUTHWIDE PROFESSIONAL TIMBER SERVICE

TIMBERLAND MANAGEMENT, INVENTORY AND APPRAISAL
—OVER 50 MILLION ACRES SINCE 1910

JAMES W. SEWALL COMPANY
FOREST ENGINEERS
OLD TOWN, MAINE

BRANCH: JAMES W. SEWALL CO. (CANADA) LTD., FREDERICTON, NEW BRUNSWICK

GEORGE BANZHAF & COMPANY

822 North Water Street MILWAUKEE 2 BRoadway 6-2062

Consultants to the Forest Industries

C. D. SCHULTZ & COMPANY,
Foresters and Engineers

WM. H. PRICE, Manager
344 Henry Building
Seattle 1, Washington

325 HOWE STREET
VANCOUVER 1, CANADA

FOREST APPRAISALS FOREST TAXATION
GROWTH AND MANAGEMENT PLANS

FRANK J. LEMIEUX
Consulting Forester
25 Years' Experience in North and South America
833 WHITNEY BLDG., NEW ORLEANS 12, LA.

POND & MOYER CO., INC.
Consulting Foresters
Estimates—Appraisals—Surveys
Machine Tree Planting Service
107 HOMESTEAD RD., ITHACA, N. Y.

Reforestation Arboriculture
S. GAYLEY ATKINSON
Consulting Forester
Huntingdon Road
Huntingdon Valley, Pa.

WILLIAM A. EASTMAN, JR.
Consulting Forester
Complete Professional Service
SEATTLE 1, WASHINGTON
410 J. GREEN BUILDING
'Phone SEneca 2814

FOREST PROPERTY
Estimates—Appraisals—Management
Prentiss & Carlisle Co., Inc.
107 Court Street Bangor, Maine

N.F. Timber Harvest Record 5 Billion Feet

A record harvest of 5,160,334,000 board feet of timber, valued at $70,616,025, was cut from national forests during the year ended July 1, 1953, according to the U. S. Department of Agriculture. This is an increase of 741,824,000 board feet over the harvest for the previous year.

Reports from Forest Service field offices indicate that much of the timber sold from national forests supplemented the income of persons living nearby, who buy the timber and convert it into pulpwood, lumber and firewood. Of the 22,020 individual timber sales made, 20,978 or 95 percent were for timber valued at less than $5,000. About 19,000 sales were for less than $500.

An additional 2,309 sales were made of forest products not measurable in board feet, such as, pine gum for naval stores, Christmas trees, evergreen boughs for Christmas decorations, maple syrup and moss. These were small sales, mostly well under $500.

Germany Honors U. S. F. S. Man

Leo A. Isaac, Pacific Northwest Forest and Range Experiment Station, Portland, Ore., attended, by request of the West German government, a forestry congress of European nations at Stuttgart, during September.

Purpose of the congress was to find ways to increase forest production. Through carefully planned introduction of Northwest tree species in European plantations such production can be increased greatly, according to Isaac, who has spent 30 years doing forest research in the Northwest. His book, *Better Douglas-Fir Forests From Better Seed*, published in 1949, has become the handbook of European for-

esters who use Northwest trees. Mr. Isaac says the greatest single problem is to secure the right seed from our natural stands and he is engaged at present in assisting in the establishment of tree seed orchards and natural seed collection areas on the national forests of the Pacific Northwest.

In May, 1951, Isaac received the University of Minnesota's Outstanding Achievement Award at a special convocation. This award is given to graduates of the university who have attained exceptional distinction in their fields. In December, 1952, the Western Forestry and Conservation Association, at its annual meeting, presented him with a plaque in recognition of distinguished achievement in the field of forestry.

After the conclusion of the congress Mr. Isaac will visit various European countries and work with foresters using our tree species.

Construction of Pulp and Newsprint Mills in Chile Aided by $20,000,000 Bank Loan

The International Bank for Reconstruction and Development has made a loan of $20,000,000 to help finance the construction of a chemical pulp mill and a newsprint paper mill in Chile. The new plants will not only eliminate the need to import paper pulp and newsprint, but will produce a surplus of these products for export.

The joint borrowers are the Cia. Manufacturera de Papeles y Cartones S.A., a privately owned corporation, and the Corporacion de Fomento de la Produccion (Fomento), an agency of the Chilean Government. The loan is guaranteed by the latter.

The new chemical pulp mill, to be located at Laja, will be designed to make unbleached, semi-bleached and bleached chemical pulp totaling about 50,000 tons per year. The newsprint paper mill will be located near the city of Concepcion and is designed to make 44,000 tons of newsprint and 6,600 tons of boxboard each year from mechanical and chemical pulp and scrap paper.

Pan American Union Makes Conservation Award

Each year for the past five years the Pan American Union has made an award to a Latin American for outstanding accomplishments in conservation. The award, made by a panel of judges selected by the Pan American Union, amounts to $2,000, granted in the form of a scholarship, a travel grant, or for the publication of significant conservation material.

This year the panel, meeting on September 15, granted the award to Mr. Francisco Tamayo, former director of forestry in Venezuela. A major factor in selecting Mr. Tamayo from the list of 10 candidates was his unusually successful accomplishment in relieving a serious overgrazing situation. This action involved the removal of 35,000 sheep, resettlement of the people in more advantageous locations, and restoration of the severely damaged watershed areas.

The panel of judges for 1953 con-

REFORESTATOR
Mechanical Tree Planter

Manufactured by
L. W. MERIAM CO.
Elsie, Michigan

THIS is the way to saw wood!

NEW POWER TOOL for easy woodcutting

New gasoline-powered McCulloch chain saw cuts firewood, pulpwood, saw logs, fence posts, poles, ties, props, beams. It fells and limbs trees. It bucks logs and prunes branches. It rips logs into construction timber It clears land and maintains orchards.

Weighs only 20 lbs. complete

$225.00
f. o. b. factory

CUTS FAST AND CLOSE!
It will take you just about *1 minute* to fell a tree like this, leaving a stump less than *1 inch* high.

AMAZINGLY EASY TO USE!
Weighs only *20 pounds complete!* Balanced for easiest felling, bucking, pruning, limbing, ripping.

WORKS IN ANY POSITION!
Saws full power *without adjustment* upside down, rightside up, any angle the work calls for.

JOE H. BRADY AND ASSOCIATES
BIRMINGHAM, ALA.

The South's Oldest and Largest Chain Saw Distributor

Foresters Mario Ravanelli, District Timber Supervisor of Pickands Mather & Co. *(left)* and Jack Storer, Osmose Plant Manager, inspect section of treated hardwood to check penetration of Osmosalts.

TREATING TIMBER FOR BIG USERS

. . . an ever growing business for Foresters and Lumber Producers

In the East, West, North and South, the rapidly expanding demand for treated timber and lumber is attracting more and more foresters and lumber producers into the wood treating business. Experts say the chief reason for this is that the substantial profits from wood treating offer them incomes that are more in keeping with today's accelerated economy.

This may well be true when you consider the fact that any lumber man with a little "spunk" and a tiny investment can set up his own wood treating plant and use his specialized knowledge to net an annual profit never before considered within the reach of a small producer.

As an example of the dollar volume of a typical treated timber user, we quote an article from the P. M. Iron News, company organ of Pickands Mather & Co.: "After months of thought, experiment and deliberation it was agreed that chemical treatment was the answer to (our) problem. In underground mines it is necessary that any chemical treatment kill the fungi which destroy timbers and yet be harmless to man; and be fire resistant; odorless; clean to handle; and reasonably low in initial plant cost. After thorough study, it was found that Osmosalts answered all these requirements, and a timber treating plant was constructed at Bessemer, Michigan. During two years of operation, more than 3½ million board feet of all types of wood have received the Osmose treatment." This is a statement from only one of the many big customers of the Osmose treating plant at Bessemer, yet the plant is managed by a forester who is under thirty years old.

If *you* are interested in securing an Osmose Wood Treating Franchise for your area, and assistance and advice in setting up a wood treating plant . . . a secure and profitable future is possible. For full details, write to John L. Surdam, Vice President and General Manager, Osmose Wood Preserving Co. of America, Inc., 980 Ellicott St., Buffalo, N. Y.

Adv.

sisted of Hugh Bennett and Ellis Clough, Foreign Agricultural Service; Bernard Frank, Forest Service; Fred Packard, National Parks Association; and Alexander Wetmore, Smithsonian Institution.

Increase in '52 State Park Attendance Reported

State park attendance reached an all-time high of nearly 150,000,000 visitors in 1952, an increase of 24 percent over 1951 and 61 percent over 1946, the first normal postwar year, it has been reported by the Department of the Interior.

These and other statistics pertaining to State parks and their operation are contained in a publication issued by the National Park Service entitled "State Park Statistics — 1952." This compilation is a phase of the cooperative program between the National Park Service and the states conducted under authority of the Park, Parkway, and Recreational-Area Study Act of 1936.

State park expenditures and operation revenues also increased during the year. Expenditures reached $40,468,523, five percent above 1951 and 162 percent above 1946. Of the total expenditures, 65 percent went for operation and maintenance, 28 percent for capital improvements, and seven percent for land acquisition. The largest expenditures were made by New York, California, Ohio, and Kentucky, each exceeding $2,000,000.

New Pocket Cruiser Stick Available

The Lufkin Pocket Cruiser Stick No. 55½ has all the scales essential for cruising making it valuable not only for foresters, but also for owners of woodlots and smaller tracts of timberland. Light in weight and convenient to carry its overall length is 25 inches; when folded only 7½ inches. The stick can be used to measure (1) both merchantable and total heights with the Merritt hypsometer scale, (2) d.i.b. with the Biltmore scale, (3) the diameter at points out of reach with the Barton dendrometer scales and (4) the diameter of logs for scaling with the Merritt hypsometer scale.

The cruiser stick has the scales necessary to obtain the figures needed for reading tree volumes from tables. The Lufkin No. 55½ Pocket Cruiser Stick is priced at $1.20 each and is available through lumber supply houses and the hardware trade.

THE LOWTHER
TREE PLANTER PLANTS
10,000 SEEDLINGS PER DAY!

With the Lowther Tree Planter, trees are properly planted for maximum survival in any soil because they have been given the right start.

Three distinct models available to cover all soil conditions and terrain.

●

For details, write:

THE HARRY A. LOWTHER COMPANY
INDUSTRY AVE., JOLIET, ILL.

By The Makers Of The Famous Lowther C-Saw

FORESTER
Seal-Tite
DRIP-TORCH
Proved superior in over 8 years of field service

Approved for use by U. S. Forest Service

★
No Flash-back
No fuel slopping
No air pump
No pressure build-up
No explosive vapors
No pre-heating
Instant operation
★
SAFE • EFFICIENT
RELIABLE • ECONOMICAL
★
Burns Diesel Fuel or Stove Oil
1¼ Gallon Capacity
Weight loaded 16 pounds

U. S. Patent No. 2376976

Write for descriptive folder and price list.

WESTERN FIRE EQUIPMENT CO.
69 Main St., SAN FRANCISCO, California

Sandvik No. 1
BUSH-AXE
WITH REPLACEABLE BLADE!

• SAFER . . .
• FASTER . . .
• EASIER . . .
THAN AN AXE—
FOR BRUSH & SAPLINGS

The thin, flat, razor-sharp blade slices easily through young, resilient stems. Balance and weight for use with one hand. Protected blade cuts closer to ground. Circular and Forester's Tool Catalog is yours on request.

WRITE DEPT. J

Sandvik Saw & Tool
DIVISION OF SANDVIK STEEL, INC.
47 WARREN STREET • NEW YORK 7, N. Y.

IN GEOLOGIC TIME, the first appearance of plant growth resembling forests as we know them today, was in the Carboniferous Age, which reached its peak perhaps 250,000,000 years ago.

Industrial and Private

COMPLETE INVENTORY CRUISING SCALE

Hypsometer
Biltmore Scale
Rigid When Open
Flexible 6-foot Steel Tape
Handy Chrome-plated Case 1¾" Dia
$3.00 EACH
IMMEDIATE DELIVERY
CARL W. GETZ, *President*
KURFEW, INC.
Lansdale, Pa.

Calder's Forest Road
ENGINEERING TABLES
Ready figured, for professional and axe handle engineers. Great time saver. The condensed experience of 30 years in the woods. Unbeatable for laying out roads. Absolutely weatherproof. Will send on approval (in U. S. only) to foresters and engineers for two weeks trial. Ask for it.
LESTER E. CALDER and DOUGLAS G. CALDER
1828 Hilyard St. Eugene, Oregon

THE KEEP WASHINGTON GREEN ASSOCIATION stepped up its highway painting plans this year because of the success of the program in 1952, and an additional number of voluntary contributions this year. New goal calls for signs in over 125 locations, compared with last year's total of 85.

Jim Lohr, above, University of Washington forestry student, puts the finishing touches on a Keep Washington Green highway sign, while President George Drake, Rudy Werberger, K.W.G. county chairman and R. W. Oltman, president, K.W.G. Ass'n look on.

PLANTING TIME IS HERE....

And for spot planting in open stands and for landowners who have only a few acres to put into tree production, nothing is better than the

COUNCIL OST PLANTING BAR

For transplanting pine seedlings, as well as bulbs and small plants, we recommend the

COUNCIL TRANSPLANTER

Fire Swatters **Fire Rakes**
Thinning Axes **Bush Hooks**

Write for full information

THE COUNCIL TOOL COMPANY, INC.
Fine Edge Tools Since 1886
WANANISH, NORTH CAROLINA

PANAMA

Because of your enthusiastic approval of our
PANAMA Pressure Type Tree Marking Gun
PANAMA Pyramid Backfire Torch
PANAMA Flame Gun

Our volume is way up and our costs are down.
We are glad to announce some help for your budget

A REDUCTION IN PRICES
On these three items

◆

PANAMA PUMP COMPANY
HATTIESBURG MISSISSIPPI

THE FIRST AWARD under the new Trees for Tomorrow, Inc. plan for recognizing outstanding forestry work by private landowners was given recently to Mr. and Mrs. Roderick McKinnon, Jr., of Vilas County, Wisconsin.

Folke Becker, president of Trees for Tomorrow, Inc., made the award, a certificate and roadside insignia, given to the McKinnons, operators of a 770-acre sugar bush farm who have been complying since 1946 with management recommendations drawn up by Trees for Tomorrow.

Shown above during presentation of the Trees for Tomorrow, Inc. award to Mr. and Mrs. McKinnon are, left to right:

Folke Becker, president, Rhinelander Paper Co.; R. H. Petry, forester, Nekoosa Edwards Paper Co.; Tom Leech, vice president, Whiting Plover Paper Co.; E. B. Hurst, woodlands manager, Consolidated Water Power and Paper Co.; Stanton Mead, president, Consolidated Water Power and Paper Co.; M. N. Taylor, executive director, Trees for Tomorrow, Inc.

Herman Work Retires

Herman Work of Staunton, Va., one of the nation's pioneers in the field of industrial forestry, ended a long association with West Virginia Pulp and Paper Co. when he became eligible for retirement on September 1.

Since 1951 he has been head of the company's Resource Survey Team, which has explored timber possibilities in this country and abroad.

Mr. Work began his career with the paper company in 1919 when he was assigned to investigate wood supply methods and possibilities in Canada, Newfoundland, Labrador and the southern states. At this time he carried out one of the early studies of the utilization of farm wood residues for pulping.

Much of Mr. Work's service was in Tyrone, Pa., and Covington, Va. While at Tyrone, he became one of the first industrial foresters to develop educational material to encourage farmers and small woodlot owners to follow tree growing and harvesting methods. This material was later assembled in a booklet, written in collaboration with W. R. Gingerich and was published in 1939. It was revised two years ago under the title, *Growing and Harvesting Tree Crops.*

In 1931 Mr. Work went to Covington to develop a pulpwood procurement territory. From 1942 to 1946 he served in the U. S. Army Engineer Corps, and returned to the paper company upon release from active duty.

Mr. Work graduated in forestry from Pennsylvania State College in 1910 and received his master's degree from the same college in 1914, after studying agriculture at the University of Tennessee. Upon graduation from college he worked for the Forest Service in the West until United States entry into World War I when he served in an Army Engineer forestry battalion.

S.P.A. and S.P.C.A. Announce 1952-1953 Reforestation Records

The Southern Pine Ass'n. and the Southern Pulpwood Conservation Ass'n. have both announced record reforestation programs for the 1952-

K&E

FROM EVERY ANGLE

Traditional K&E care and precision go into the making of these useful forestry instruments . . . K&E Right Angle Instruments and The K&E Hand Level with a right angle feature.

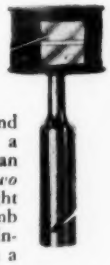
These instruments are *rugged* . . . designed to stand up without the need of constant adjusting even under the rough usage of forest work.

THE RIGHT ANGLE PRISM

This compact instrument consists of a single ground triangular prism and it, therefore, cannot get out of adjustment. A plumb bob can be attached to the hook of the handle.

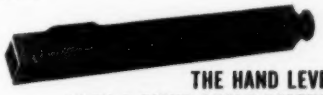
THE RIGHT ANGLE MIRROR

This instrument gives a slightly larger field of view and is adjustable. As an added feature, a small plumb bob is conveniently stowed in the handle.



THE DOUBLE RIGHT ANGLE PRISM

Consisting of two ground pentaprisms separated by a plano-parallel element, it can be *placed on a line between two points* and a third point at right angles can be sighted. A plumb bob can be attached or the instrument can be mounted on a staff.



THE HAND LEVEL WITH A RIGHT ANGLE FEATURE

Here is a dual-purpose instrument with all of K&E's famed precision. While its principal use is as a hand level, it offers the right angle feature as well. Note the flat base permitting use on a level board.

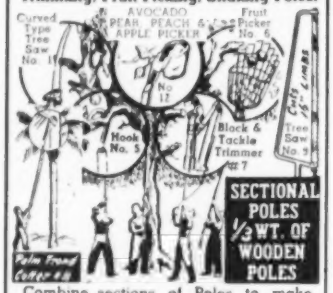
Ask any K&E Distributor or Branch for further information or write Keuffel & Esser Co., Hoboken, N. J.

KEUFFEL & ESSER CO.
EST. 1867
Drafting, Reproduction, Surveying Equipment and Materials, Slide Rules, Measuring Tapes.
New York • Hoboken, N. J.
Detroit • Chicago • St. Louis
San Francisco • Los Angeles • Montreal

BRANDING HAMMERS
For branding logs, poles, ties, and pulpwood. Trade-mark your products.
A. R. SMITH
Marking Devices
10003 S. E. ECKLER AVENUE
PORTLAND, OREGON

HAGA-ALTIMETER
Aim at TREETOP and read HEIGHT from scale

PRICE $24 | LEATHER CASE $4 | RANGE-FINDER $14
Write for free booklet
Wm. J. WOLFF — 15012 CHURCHILL STREET
SAN LORENZO, CALIFORNIA

DON'T BREAK YOUR NECK! PREVENT ACCIDENTS!
Prune the Tallest Tree While Standing Safely on the Ground
CUT LABOR COSTS 'n 50%
DOUBLE PRODUCTION! With the New, Amazing, LIGHTWEIGHT ALUMINUM Comb. Sawing, Pruning, Trimming, Fruit Picking, Shaking Poles.

Curved Type Tree Saw No. 1
AVOCADO PEAR, PEACH & APPLE PICKER
Fruit Picker No. 6
No. 17
Cuts 8' Limbs
Hook No. 5
Block & Tackle Trimmer #7
Tree Saw No. 9
SECTIONAL POLES ⅓ WT. OF WOODEN POLES
Combine sections of Poles to make Poles up to 90 ft. tall. Weighs 1 lb. per 5 ft. 70c per ft. Attachments extra. No breakage. No splinters. Lasts forever. Send for FREE
HOW TO PRUNE FRUIT & SHADE TREES
CATALOG & FREE BOOKLET
J. B. Scheell CORP.
300-S. Los Angeles St.
Los Angeles 13, Calif. - MA. 6-9397

1953 seasons by lumber companies and the pulp and paper industry.

The Southern Pine Assn. announced that lumber companies planted nearly 66 million seedlings in 12 states during the past season, the highest number since the 1949-1950 season, and in addition distributed 2.2 million seedlings free to farmers.

Louisiana lumber manufacturers led the 12 southern states with 26.5 million seedlings planted; Alabama was second with 9.6 million; and Arkansas third with 7.8 million. Nearly 72,000 acres of land were reclaimed for forest production.

The Southern Pulpwood Conservation Assn. said that the pulp and paper industry was responsible for planting 128 million trees in 11 states, or 43 percent of the approximate total of 300 million planted by all agencies, companies, and individuals in these states.

This was an increase of 75 percent over last year, and brought back into forest use 128,000 acres of land. The industry planted 101.5 million trees on its own lands and gave 26.5 million to private landowners.

Schultz and Company Open Prince George Office

C. D. Schultz and Company Limited, Foresters and Consulting Engineers of Vancouver, B. C., and Seattle, Washington, announce the opening of their office in Prince George, B. C.

Mr. A. I. W. (Ian) Mackenzie has been appointed resident manager at Prince George. Mr. Mackenzie has been associated with the company some years.

Students Complete Study at TECO

Four outstanding forestry students from Washington, Minnesota, Connecticut, and Michigan received special certificates recently to mark their completion of a ten-week course in wood technology and utilization at the Timber Engineering Company laboratory, Washington, D. C.

The four received their TECO training under $500 scholarships awarded earlier this year by the National Lumber Manufacturers Assn. who operate the laboratory.

Those completing the course were Douglas N. McClary, University of Washington; Bruce R. Jones, University of Michigan; William R. Francis, Yale University; and Donald G. Butler, University of Minnesota.

St. Regis Announces Promotion of Lightsey

St. Regis Paper Company announces the appointment of William F. Lightsey as assistant manager, Woodlands Division in Jacksonville, Fla. In his new position, Mr. Lightsey will assist Marcus C. Rawls, the division manager.

Mr. Lightsey joined St. Regis Paper Company in 1951. He had previously been employed by Union Bag and Paper Corporation, Dixie Wood, Inc., and Augusta Hardwood Company. He received his Bachelor of Science (Forestry) degree from the University of Georgia in 1947 and his Master of Forestry degree from Duke University in 1948.

Minn. & Ont. Paper Co. Research Award

Roger R. Bay, a June, 1953 honor graduate of the University of Idaho School of Forestry, has received the Minnesota and Ontario Paper Co. Forestry Research Project award for 1953.

The award provides for concentrated studies on forestry problems meriting special attention, and will be used this year to continue the study of reproduction in cutover areas of the spruce-fir-hardwood type on state and

Code of Ethics

The Code of Ethics for the forestry profession has been appropriately printed for framing. Legibly and attractively printed in two colors, black and green, on heavy paper, 13" x 20." Any member may obtain for 25 cents to cover cost of printing, postage, and mailing tube. Order today.

SOCIETY OF AMERICAN FORESTERS
Mills Building, Washington 6, D. C.

SEEDS FOR NURSERYMEN
TREE — SHRUB — PERENNIAL —
FLOWER — VEGETABLE
Correspondence with Seed Collectors Invited
HERBST BROTHERS
Established 1876
678 BROADWAY NEW YORK 12, N. Y.

private lands in northern Minnesota.

Mr. Bay has had forestry experience with the Bureau of Entomology and Plant Quarantine in Idaho, and with the Forest Service in Montana.

Robert N. Hoskins, industrial forester, Seaboard Air Line Railroad Co., received the Distinguished Service Award for outstanding service to the South Carolina Vocational Agriculture program on August 20. The plaque was given during the annual teachers' meeting at Clemson, by R. D. Anderson (right), state supervisor of vocational agriculture, as Everett Q. Davis, assistant general freight agent for the railroad looked on. This was the fourth plaque awarded as individual recognition during the 25 year history of the Future Farmer program in South Carolina.

Government

F. H. Raymond Heads Calif. Division of Forestry

DeWitt Nelson, director, California Department of Natural Resources, Sacramento, has announced that Francis H. Raymond, chief deputy state forester, assumed the full administrative responsibilities for the Division of Forestry on September 10. For the past ten years deputy state forester in charge of the North Coast District with headquarters in Santa Rosa, Mr. Raymond was promoted to chief deputy state forester on May 1, 1953.

After three years of forestry training at Colorado College, he joined the California Forest and Range Experiment Station in 1929 as a field assistant. Two years later he became a ranger in the California State Division of Forestry with which agency he has served 22 years at all levels of responsibility.

Allen Appointed to Mich. Conservation Comm.

Shirley W. Allen, retiring professor of forestry at the University of Michigan, has been appointed by Gov. G. Mennen Williams to the Michigan Conservation Commission, to succeed Harold W. Glassen.

Mr. Allen is a past president of the S.A.F. He served on the S.A.F. Council in the 1940-1941 term, and was vice president of the Society from 1942 to 1945. He has been a member of the forestry faculty at Michigan since 1928.

Mr. Allen is the author of *An Introduction to American Forestry*, and *A Handbook of Information on Entering Positions in Forestry*.

$1 Million Federal Funds To Aid N.W. Fire Fighting

Over $1 million of federal funds has been earmarked for Oregon and Washington state forestry organizations to assist in control of forest fires during the current fiscal year. The funds are an annual allotment under the Clarke-McNary Law.

Oregon will receive $591,056 and Washington $541,227, the Forest Service announced.

Regional Forester J. Herbert Stone pointed out that about one-third of the total annual timber cut in the nation is produced in Oregon and Washington.

TREEP

THE ONLY TREE PLANTING SLED

Adapted to all sorts of planting conditions — sandy to stony soils, level fields to steep hillsides. Especially useful where the ground is rough and the going tough.

For circular write:

TREEP P. O. Box 163 Syracuse 10, N. Y.

Companion "Workhorses" for Forest Fire Work . . .

Three Hale Portable Centrifugal Pumping Units — FZZ, FZ and HPZ—provide

amazing volumes and pressures for efficiently fighting a great variety of Forest Fires.

Write today for full Information on the "3 Workhorses."

HALE FIRE PUMP CO. CONSHOHOCKEN, PA.

FOREST METEOROLOGIST

Fire Danger Rating . . . Weather Instruments Sales and Service . . . Weather Modification Research . . . Forecasts and Advisories

J. B. "Ben" MELIN

2806 32nd Ave. S. Seattle 44, Wash.
Telephone RAinier 0356

Airplanes are simple tools . . .

There's nothing mysterious, or tricky, or gold plated about an airplane in the timber business. It's just another useful tool—like an axe, a brush hook or a chain saw.

And for many jobs, the airplane is the fastest, most economical, and most efficient!

It is a *brush-killing tool . . .* an *insect control tool . . . a seeding tool.* It is a tool that should be working to protect *your* timber!

For facts and figures, write:

CENTRAL AIRCRAFT INC.

PHONE 4149 YAKIMA, WASH. P.O. BOX 1364

tree farmers plan for proper land use...

Proper land use is the deciding factor considered by tree farmers when they determine what lands are to be placed under forest management. The land that is selected for growing trees as a recurring crop is predominantly hilly, remote, or is otherwise undesirable for any other use. When surveys show that sections of these areas are more suitable for agriculture than tree farming, it is a company policy to make such lands available for ordinary farming.

The principle of proper land use is pictured above. On rich bottom land released by the forestland owner, the dairy farmer will reap crop after crop each year. On the hills and mountains beyond, the tree farmer also will grow repeated crops . . . trees to be harvested every 30 to 100 years. Young Douglas firs will thrive on the clear-cut sunlit slopes, growing from wind-borne seeds carried from blocks of mature trees left standing as a natural seed source.

In America there are more than 4400 privately owned tree farms, operated on about 28 million acres. All Weyerhaeuser Timber Company operating forestlands are managed as tree farms. *Write us at Box A, Tacoma, Washington for your free copy of our colorful booklet, Tree Farming in the Pacific Northwest.*

For farm and city building, West Coast woods offer the advantages of unusual strength, durability, economy and beauty.

Pacific Northwest mountain regions are more suitable for growing trees than for the production of any other kind of crop.

Wood is one of the nation's most valuable and versatile raw materials. People and industry use wood every day as lumber, pulp and paper, fibers, chemicals and in many other ways. To supply this market, our company is growing trees and manufacturing a variety of forest products.

Weyerhaeuser Timber Company

National opinion surveys indicate that the public does not know about the progress being made in industrial forestry. Weyerhaeuser Timber Company is telling part of the story in a series of national magazine advertisements such as reproduced above. The Company believes that all who are engaged in industrial forest management should tell the facts about tree farming at every opportunity.

WORKING IN THE PACIFIC NORTHWEST TO CREATE A PERMANENT FOREST INDUSTRY

Forest Taxation in Maine

The Maine legislature in the 1953 session adopted an amendment to the tax laws, which affords forest owners an opportunity to secure court review of assessments on such property on the basis of their ability to prove that the tax burden creates an incentive to abandon or strip the land. The law, with its preamble is as follows:

An Act to Secure Uniformity of Assessment of Forest Lands for Purposes of Taxation

Preamble. Whereas, the prosperity of the state is deemed to be dependent in large measure upon its forest lands and upon the management and operation of these forest lands in a manner designed to assure a sustained annual timber crop sufficient to provide a continuing supply of raw materials for its wood-using industries; and

Whereas, the maintenance of an adequate forest cover on the watersheds of rivers is necessary for the prevention of land erosion, for the protection of persons and property against the danger of floods, and for regulations of streams to effect uniformity of flow and to increase the reliability of water power; and

Whereas, it is essential to preserve the incentive necessary to assure the management of forest land by their owners to this vital end; and

Whereas, it appears that existing methods of assessment of forest lands for purposes of taxation are at substantial variance among assessing authorities, despite the constitutional requirement of state-wide uniformity of assessment, and otherwise contrary to sound public policy; now, therefore, Be it enacted by the People of the State of Maine, as follows:

Forest Lands

Sec. 156. Policy. It is hereby declared to be the public policy of the state, by which all officials of the state and of its municipal subdivisions are to be guided in the performance of their official duties, to encourage by the maintenance of adequate incentive the operation of all forest lands on a sustained yield basis by their owners, and to establish and maintain uniformity in methods of assessment for purposes of taxation according to the productivity of the land, giving due weight in the determination of assessed value to location and public facilities as factors contributing to advantage in operation.

Sec. 157. Assessment. An assessment of forest land for purposes of taxation shall be held to be in excess of just value by any court of competent jurisdiction, upon proof by the owner that the tax burden imposed by the assessment creates an incentive to abandon the land, or to strip the land, or otherwise to operate contrary to the public policy herein declared. In proof of his contention the owner shall show that by reason of the burden of the tax he is unable by efficient operation of the forest land on a sustained yield basis to obtain an adequate annual net return commensurate with the risk involved.

For the purposes of this section forest land shall be held to include any single tract of land exceeding 25 acres under one ownership which is devoted to the growing of trees for the purpose of cutting for commercial use.

F.S. Complete Aerial Spraying of Oregon and Calif. Rangelands

The Forest Service has announced completion of an aerial spraying project with 2-4-D to eliminate invading sagebrush from perennial grassland forest ranges. This project covered an area of 3,000 acres on the Fremont and Modoc National Forests in southern Oregon and northeastern California.

The spraying job was done by Demers Flying Service of Salem, Ore.

Forest Officials point out that this project, one of many such planned, resulted from successful control of sagebrush by this means in 1951 and 1952. Two pounds of 2-4-D in 7½ gallons of water and diesel oil mixture was applied on each acre treated. This rate of application previously resulted in an 85 to 98 percent kill of sagebrush.

Stockmen permittees on treated ranges have agreed not to graze these areas for a period of two years so that the valuable forage grasses will have every opportunity to make a vigorous comeback.

Elbert L. Little to Spend Year in Venezuela

Elbert L. Little, Jr., U. S. Forest Service, Washington, D. C., is on a year's leave of absence to take the position of visiting professor of botany in the forestry school of Universidad de Los Andes, Merida, Venezuela. Besides teaching tropical dendrology and botany, he is doing research on the trees of Venezuela; collecting tree specimens to build up the forestry school herbarium; and preparing an

The Personal Notes of a Pioneer in Conservation

ROUND

RIVER

From the Journals of

Aldo Leopold

These previously unpublished selections from the writings of Aldo Leopold offer a fascinating glimpse into the life and mind of a great man.

To anyone who knows the pungent charm of his previous book, *A Sand County Almanac* (which the *N. Y. Times* called "outdoor writing at its best"), ROUND RIVER will come as a new delight—full of wisdom and humanity, a record of reflections and observations on all aspects of nature by a man who loved it and lived with it.

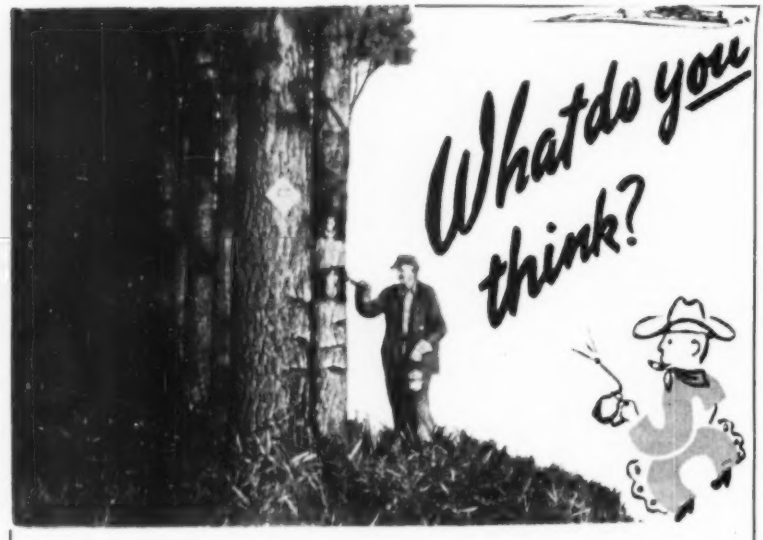
The daily entries in his journals were written in camp on his field trips—hunting, fishing, exploring; many of them indicate the source of his ideas on land ethics. The longer essays are taken from contemplative notes, which were still in manuscript when he met his tragic death fighting a grass fire.

Every page retains something of his personality. Taken together they reveal the growth of his extraordinary perception about man and nature, the difference between land and country, the lessons of natural history, the pleasure in the sight and pursuit of game, the meaning and use of leisure. To read ROUND RIVER is to share the companionship of a knowing man who stimulates both the mind and the spirit.

26 illustrations by
CHARLES W. SCHWARTZ

At all bookstores. $3.00

OXFORD UNIVERSITY PRESS
114 Fifth Avenue, New York 11



About Boundary Marking Paint?—Its primary and secondary uses?—Its "best" colors?

From where we sit, Boundary Marking Paint, that relative newcomer, is coming in for quite a bit of attention among foresters. We wonder whether this increased interest indicates that foresters are turning to Southern Glo Boundary Marking Paint from expensive house and traffic paints . . . whether there is a parallel increase in the amount of boundary marking performed by foresters . . . or whether foresters are finding uses for this paint on other than boundary marking jobs.

For instance, cutting practices described by a Michigan forester as standard in his section of the country, set up a perfect case for Southern Glo Boundary Marking Paint. "Hardwoods," this forester explains, "are marked in the fall and cut in the winter. Stump checks cannot be made until late in the following spring. In the meantime, heavy spring rains and sap run tend to wash regular tree marking paint."

Yes, it's red!

With increased interest in Boundary Marking Paints, increased interests in the variety of Southern Glo colors is natural. In no other Southern Glo forester's paint is preference so evenly distributed among the standard colors available.

For instance, one of the most popular is Southern Glo red,—a bright Chinese red that makes an outstanding mark that retains its brilliance after weathering. Vivid Southern Glo blue,—such as that seen so often along Georgia highways,—is another favorite. Possibly this is because blue is a color used so sparingly by nature in vegetation, that a manmade mark in blue is spotted quickly in any season.

Southern Glo Boundary Marking Paint is especially formulated to give a long lasting, highly visible mark. Based on the new stay mixed formula #71020, it comes in consistency readily applied by brush, but may be thinned for gun application, depending on duration desired of mark. In addition to red and blue, it comes in yellow, white, orange and aluminum.

SOUTHERN COATINGS & CHEMICAL COMPANY

Dept. N-2, Sumter, South Carolina

illustrated manual on the important forest trees of the country.

Dr. Little also has a supplemental grant under the educational exchange program of the International Information Administration, United States Department of State.

The forestry school of the Universidad de Los Andes was selected by the F.A.O. last year as the training center for Latin American forestry.

B.L.M. Makes Record Payment From O. and C. Lands

Eighteen western Oregon counties have received checks totalling $6,422,026.63 which is their share of the 1953 income produced by the revested Oregon and California railroad grant lands according to the Department of the Interior.

This year's payment to the counties is $368,568.24 greater than the previous high of $6,053,458.39 paid in 1952.

The total volume of timber sold on the O. and C. lands in 1952 was 405 million board feet. In 1953 this rose to 511 million board feet.

Louisiana Asks for More Survey Funds

The Louisiana Forest Survey, now at the half-way mark, is running short of funds, according to State Forester James E. Mixon.

He announced that $25,000 in contributions from private industry is needed to complete the survey by mid-1954.

The survey, first to be taken of the state's timber resources since 1930, is being conducted by the Southern Forest Experiment Station, New Orleans, with the help of private industry and the Louisiana Forestry Commission. Purpose is to determine how much timber is in the state and if it is decreasing or increasing.

Mixon explained that, with the fire season approaching, all state personnel and many existing industry crews will be needed to fight forest fires. "We will not be able to spare men for the survey until after March," he said, "so more funds are needed by the experiment station to hire other survey crews."

The state forester said it was important to complete the survey before next May, if possible, so the legislature would know the outlook of forest industry in the state as there are many important forestry bills due for consideration in the next session, and legislators should have the benefit of

these facts upon which to base their decisions.

Private industry, spark-plugged by the Central Louisiana Electric Company of Alexandria, has contributed almost $30,000 to the survey in manpower and cash so far. Largest co-operators are: Gaylord Container Corporation of Bogalusa, International Paper Company of Mobile, Ala.; Southern Advance Bag and Paper Company of Hodge; A. J. Hodges Industries of Shreveport; Louisiana Power and Light Company of New Orleans; Crossett Lumber Company of Crossett, Ark.; Crosby Chemicals Corporation of DeRidder; and Long-Bell Lumber Company of Kansas City, Mo.

The Louisiana Forestry Commission has matched industry's contribution, having as many as eight timber cruisers in the field at one time.

Education

J. W. Duffield Becomes Univ. of Wash. Professor

The University of Washington College of Forestry announces the appointment of Dr. John W. Duffield as assistant professor of Silviculture, effective September 16. Prior to coming to the University, he was employed by the California Forest and Range Experiment Station as director of the Institute of Forest Genetics.

J. W. DUFFIELD

Dr. Duffield received his undergraduate training in forestry at Cornell University, his master's degree in forestry from Harvard University in the field of silviculture, and his doctorate in genetics from the University of California.

During September and October, 1952, he participated, as United States delegate, in the eucalyptus study tour sponsored jointly by the Commonwealth of Australia and the Food and Agricultural Organization of the United Nations. Enroute back to the United States, he spent three weeks studying the forests of New Zealand, particularly the coniferous plantations. Previously, he had had some experience in the forests of Central America. During World War II he served in the U. S. Army and saw service in French Morocco and Italy.

Dr. Duffield is well known in the field of forest genetics, has done work in the breeding of better strains of various pines, and is the author of numerous publications in the forest genetics field.

BELSAW ... Over 30 Years in the Development and Manufacture of PORTABLE SAWMILL EQUIPMENT

Thousands of Belsaw Portable Sawmill users throughout the world ... Belsaw goes right to the trees, thus getting more lumber from all the cut timber. For low cost, high quality production the Belsaw line leads the field. Write today for Free Book, "How To Make Lumber."

BELSAW MACHINERY CO
8913 Field Building, Kansas City 11, Missouri

SILVA COMPASS
Simpler — More Accurate
Recommended by foresters for cruising. Easier to use, faster, positive. Direct course readings. *Write for free literature and instructions.*
SILVA, INC., Dept. J, LaPorte, Ind.

GROW TREES
FOR XMAS TREES AND FORESTRY
Fir, Pine and Spruce in Variety
Seedlings and Transplants
Write for Price List
Suncrest Evergreen Nurseries
P. O. Box. 643, Johnstown, Pa.

LEUPOLD *Engineered* LEVELS

Advanced engineering and precision manufacturing techniques have earned world-wide acclaim for LEUPOLD Engineered instruments since 1907. Exclusive LEUPOLD features and dependable LEUPOLD accuracy are your assurance of time-saving, trouble-free service under all working conditions.

LEUPOLD ABNEY LEVEL
Topographic mapping, checking road grades measuring tree heights and general leveling work are all accomlished quickly and accurately with the Leupold ABNEY LEVEL.

Exclusive LEUPOLD design holds 2 or 3 scales in milled slide, ready for immediate use without removing and reversing the frame. . . Saves time and trouble on all jobs.
Bubble magnifier adjusts internally to the user's eye. No draw eye piece to retract for carrying, no re-focusing each time instrument is used. Overall length 6½". Comes in saddle leather case with belt loop.
Four scales available: per cent, topographic, degrees and chainage corrections.
MODEL A (Choice of any 2 scales) $27.50
MODEL B (Choice of any 3 scales) $30.00

LEUPOLD HAND LEVEL

Precision engineered for all preliminary leveling work. Exclusive LEUPOLD bubble magnifier adjusts internally to user's eye...lessens eyestrain and permits faster and more accurate readings. Overall length 5¼". Comes in saddle leather case with belt loop $11.70

ALL MAKES OF LEVELS, COMPASSES AND SURVEYING INSTRUMENTS REPAIRED.

LEUPOLD & STEVENS INSTRUMENTS, INC.
4445 N. E. Glisan Street, Portland 13, Oregon

AT YOUR INSTRUMENT DEALER OR USE THIS MAIL ORDER COUPON
Enclosed is ☐ check or ☐ money order for $_____. Please send the LEUPOLD Level checked below. (no c. o. d.)
_____ ABNEY LEVEL, Model A @ $27.50
_____ ABNEY LEVEL, Model B @ $30.00
with the following scales:
_____
_____
_____ HAND LEVEL @ $11.70
Send literature on ☐ Levels ☐ Compasses
Name _____
Address _____
City _____ Zone _____ State _____

The New GA-8 PACIFIC PUMPER

Now in regular service and field tested and approved, the new "GA-8" is showing itself to be another top performer in the famous PACIFIC PUMPER line.

With or without electric starter* the lightweight "GA-8" is especially adapted to tanker use . . . as a portable unit the special sled-type mounting means easy handling in rough terrain. Light enough to be readily carried, the air-cooled, 4-cycle engine develops top volume and pressure for its weight.

The engine and pump are standard Pacific Units and have been fully tested and approved.

*Optional equipment.

DIMENSIONS

Length	28¾ inches
Width	19¼ inches
Height	24¼ inches

NET WEIGHT

GA-8 (without starter)	115 lbs.
GA-8-S (with starter)	140 lbs.

PERFORMANCE

Pressure	G.P.M.
50	26
100	24
150	22
200	21
250	20
300	16

Normal operation is 20 G.P.M. at 250 lb. pressure.

PACIFIC "Pacolized" Hose

is a made-to-order partner for all portable or emergency water supply equipment. "Pacolized" Hose is permanently mildew-proof and rot-resistant. Made from "line" flax fibers it is the most flexible hose of its type, lightweight and easy to carry.

Specify "Pacific" Pumpers, Hose and accessories. Write for information on the new "GA-8" and the full line of PACIFIC fire equipment, perfected for portability and high performance.

PACIFIC Marine Supply Co.
FIRE EQUIPMENT DIVISION
SEATTLE 1, WASHINGTON

Two Carolina Colleges Announce Coop. Forestry Plan

The School of Forestry at North Carolina State College, and Western Carolina College have entered into a cooperative educational program for the training of forestry students, according to Dean Richard J. Preston of the forestry school at North Carolina State.

The program will enable students of Western Carolina College who have completed certain courses of study to transfer to the School of Forestry at State College without loss of academic credit.

Dr. Preston further explained that students who have completed two or three years of college with acceptable scholastic records and who have essentially met the requirements in botany, chemistry, mathematics, and physics and the social sciences may complete requirements for a forestry degree in two years plus one summer, providing they start their program with the summer camp.

Conservation Education Association Organized

The Conservation Education Association was organized at Purdue University in September as a national professional group to promote conservation education. It supercedes the National Committee on policies in Conservation, which was dissolved.

President of the new organization is Dr. A. G. Peterson, President of the Eastern Montana College of Education.

Other officers of the association are Dr. Howard Michaud of Purdue University, vice president; Dr. Richard L. Weaver of the University of Michigan, secretary; and William Voigt, executive director of the Izaak Walton League, treasurer.

The board of directors is composed of Dr. R. H. Eckelberry, Ohio State University; Dr. E. L. Palmer, National Wildlife Federation; Dr. Olin Capps, Missouri Conservation Commission; Arthur S. Rollins, Superintendent of schools in Plymouth, N. H.; Dr. E. C. Harrah, Colorado State College; A. C. Dawson, Texas Game and Fish Commission; and C. W. Mattison, Washington office, U. S. Forest Service.

Lalor, Hoyle, and Gran Join State Univ. of N. Y. Faculty

State University of New York College of Forestry has announced three appointments to its faculty and research staff.

Richard W. Lalor has been named assistant professor of English, to take part in an experimental program to improve communications skills of the student foresters. He has taught at the University of Chicago, and Champlain College. He is a graduate of State College for Teachers, Albany, with a B.S. degree, and has his M.S. degree from Cornell University.

Robert J. Hoyle, Jr., formerly with the Timber Engineering Co., has been made research assistant in Forest Utilization. He has also worked for the U. S. Forest Products Laboratory, Madison, Wis.; and for the Eastman Kodak Co., Rochester, N. Y. He holds a B.M.E. degree from Cornell University, and a M.S. degree in forestry.

Gunnar Gran, a recent arrival from Sweden, where he was research engineer and chief analyst at the Swedish Forest Products Research Laboratory, Stockholm. At State University of New York he will work on a project on the pulping of hardwood, sponsored by Empire State Paper Research Assoc., Inc.

IMPORTANT NOTICE TO SUBSCRIBERS

If you are going to move, it is necessary that the proper notification be made, at the earliest possible moment by letter, post card, or post office form No. 22S, giving the old address, as well as the new, with postal-zone number if any. You should also notify your local post office on postal form No. 22 of your change of address. Both postal forms are obtainable at any post office.

As considerable time is required to process a change of address, you are urged to advise the JOURNAL as soon as you know your new address, preferably four weeks in advance.

JOURNAL OF FORESTRY
Mills Building, Washington 6, D. C.

Don't buy any chain saw until you see a DISSTON demonstration

"The Champ of the Woods"

SEE the smooth-running

DISSTON DA-211

with 9 h. p. Mercury Engine

SEE this rugged, reliable worksaver cut and you'll agree there's no job too tough for it! So expertly designed and built it runs at top speed without vibration or chatter.

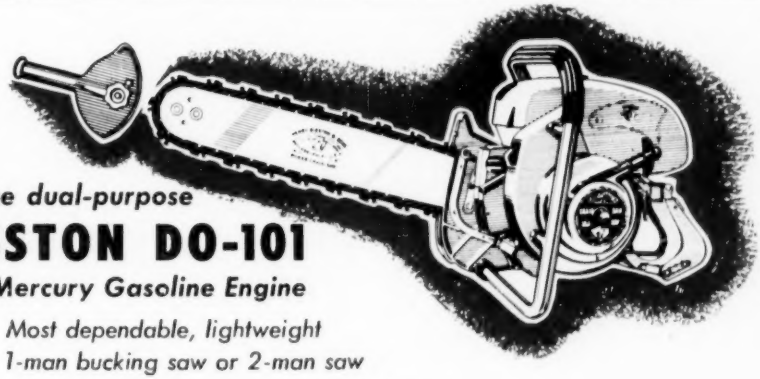
SEE why it's the undisputed leader for low cost high production cutting of big timber. Meets *every* logging need.

SEE the cutting attachments available which extend the saw's usefulness, including narrow profile guide rails for pulpwood up to seven feet long and 25" Bow Saw attachment.

New

LOW PRICES!

ON ALL DO-101 MODELS



SEE the dual-purpose

DISSTON DO-101

with Mercury Gasoline Engine

Most dependable, lightweight 1-man bucking saw or 2-man saw

SEE this amazing saw in action... you'll find it hard to believe! A smooth-running powerhouse that cuts tough logs in seconds. Compact, precision-built Mercury Gasoline Engine keeps it running all day every day.

SEE the many cutting attachments, including: Spee-D-Tach tailstock for quick conversion to 2-man use. A choice of seven rail lengths from 18" to 40".

FREE

Illustrated 32-page booklet "How to Make Money and Cut Costs with Chain Saws." Write today.

SEE these great saws in action.
Ask your dealer for a demonstration today!

HENRY DISSTON & SONS, INC.

BURNING *and* COSTS ... *under control!*

Rayonier Inc. has about 400,000 acres of timber in the Nassau Forest near Becker, Florida. To prevent an excessive accumulation of inflammable growth, the company burns every two or three years. Key machines in its woods operation are eight Caterpillar Diesel Tractors—seven D4s and one D6. This D4, pulling a fire line plow, cuts a swath 5′ wide for fire control. "We're well satisfied with Caterpillar equipment," Forester Stuart H. Davis says. "We have one D4 about 10 years old. They're mighty tough machines."

Their toughness is one reason they keep costs down for you. They're built to stand up under punishment that sidelines less rugged machines. For example: track shoes are made of rolled steel, heat treated for long life. Sealed track rollers and idlers keep mud and dust out, and oil in, for longer wear. These and many other important details all add up to performance that pays off in *more* work with *less* down time at *lower* cost—not just when the machines are new, but year after year after year.

Your Caterpillar Dealer, with his store of genuine parts, is another factor in keeping costs down. If you need service, he answers your call—any time, anywhere—promptly. He'll be glad to give you complete *facts* about the big yellow machines. Phone him today—ask him to demonstrate on your toughest job!

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

* Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE